NEW ZEALAND
JOURNAL OF

Agriculture

JUNE · 1955

Cooper News

FARM BULLETIN published by COOPER, McDOUGALL & ROBERTSON (N.Z.) LTD.
World famous Manufacturers of Sheep Dips, Worm Drenches and other Stock Remedies.

No. 42 PUBLISHED EVERY SECOND MONTH June, 1955

COOPER DRENCHES are selected by WISE FARMERS

If it's Phenothiazine there is a Coopazine Drench to meet your requirements . . . .

COOPAZINE POWDER provides Phenothiazine in its most economical form. 1lb. drenches 20 to 30 sheep or 10 to 20 cattle. Packed in 1lb. and 10lb. tins, also 56lb. drums.

COOPAZINE LIQUID comes to you ready to use in a convenient tin for carrying. Remains in suspension during drenching. 1 gal. sufficient for 106 to 160 sheep or 53 to 106 cattle. Quarts, 1 gal. and 4 gals.

COOPAZINE TABLETS for quick, clean drenching. 3 tablets for lambs and 5 for adult sheep. Tins 500 and 250.

If it's Nicotine, Copper-Sulphate there is . . . . .

COOPER'S N.C.A. DRENCH. Containing Nicotine Copper-sulphate in scientifically combined form. 16oz. bottle sufficient for 160 sheep or 426 lambs, or for 80 to 320 cattle according to age.

If it's Carbon Tetrachloride for Fluke you have . . . . .

COOPER'S FLUKE & WORM DRENCH, containing Carbon Tetrachloride, is the recognised remedy for Liver Fluke. ½ and 1 gals.

A DAIRY OINTMENT WITH A DIFFERENCE

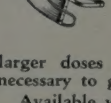
COOPER'S DAIRY OINTMENT offers unique advantages. Chief of these is that it is water miscible (mixes with water) which means that it really penetrates wounds with a watery discharge and thus gets to the seat of the trouble. Its exceptionally powerful bactericidal properties destroy the bacteria most commonly associated with mastitis and although it does not claim to cure this complaint it does act as a powerful preventive. Will not taint milk and is invaluable as a general veterinary and healing ointment. Packed in 2lb. and 10lb. tins.

TRY COOPER'S DAIRY OINTMENT FOR YOURSELF

GOOD DRENCHING GUNS MAKE DRENCHING EASY

For Liquid Drenches
VICTOR DRENCHING GUN

Efficiency and accuracy are the main requirements of a good drenching gun and are amply provided by the Victor. It is also of simple, sturdy construction and as trouble-free as a gun can be.



Designed for phenothiazine and nicotine copper-sulphate drenches, the pistol is calibrated up to 1 fl. oz. and when larger doses are required it is simply necessary to give two light pressures.

Available with either Non-drip Nozzle or McMaster Oesophageal Tube.

For Phenothiazine Tablets
COOPER Repeater GUN

(BECK PATENT)

Excellent automatic gun especially designed for the fast and efficient administration of phenothiazine tablets. Capacity 6.

OTHER PRODUCTS

COOPER'S MARKING PENCILS in neat telescopic tubes for instant use—Red, Blue and Black.

TRI KOS PISTOL. Handy, well-made suction type drenching pistol.

FLEXOPAD. Automatic branding appliance. Eliminates wastage and mess.

COOPER'S MANGE DRESSING. Based on "Gammexane" this provides an up-to-date, easily applied and speedy method of eradicating obstinate cases of mange. 4oz. cartons and 7lb. tins.

COOPER'S POWDER FLY SPRAY. A most valuable aid in the prevention of fly strike on sheep for a lasting period.

COOPER'S FRESHAIRE (In Aerosol Form). Scientific air freshener. Contains all the essential neutralising and oxidising agents necessary for the fast and certain elimination of unpleasant odours. Does not merely mask an odour but neutralises it scientifically. 6oz. and 12oz.

COOPER'S AEROSOL. Super-efficient "*Pybuthrin*" household fly-spray, 6oz., 12oz. and 20oz.

Write for particulars of any of the above products.

Hand Dressing Footrot
COOPER'S FOOTROT PAINT

A new and improved type of hand dressing for treating individual sheep. Free flowing, non-greasy and easily applied. Each ½ pint tin is sufficient for 125-120 applications and is supplied with a brush for application.

RID YOUR STOCK OF LICE — USE
COOPER'S LOUSE POWDER

Lice reduce profits. Stock cannot thrive when hosts to lice. Constant irritation prevents peaceful grazing and general debility results. Lice on cattle, horses and other stock can be easily and cleanly eradicated with COOPER'S LOUSE POWDER containing BHC ("Gammexane"). It rapidly kills all lice present and having remarkable qualities of persistence, it copes effectively with young lice as they hatch from the nits. Lice can be cleaned up on stud sheep at times when dipping is undesirable.

COOPER'S LOUSE POWDER is supplied in handy 1lb. duster top cartons and should have its place on every farm.

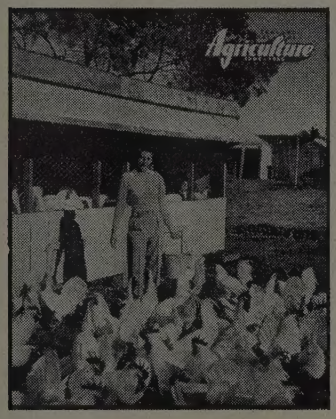
ALL the products featured on this page are obtainable from Stock and Station Agents and Merchants, or write to:
COOPER, McDOUGALL & ROBERTSON (N.Z.) LTD., Box 599, Auckland.

Volume 90
Number 6
15 June
1955
(Established 1910)

NEW ZEALAND JOURNAL OF Agriculture

Published by
Direction
of
Rt. Hon. K. J. Holyoake,
Minister of Agriculture

This Month's Cover



A group of healthy, vigorous White Leghorn cockerels are shown on this month's cover. They were photographed by D. R. Brenchley on a Henderson (Auckland) poultry farm before the breeding season. The owners are accredited breeders under the New Zealand Poultry Flock Improvement Plan, which has been established since 1945 and is controlled by a Dominion committee consisting of poultry breeders and officers of the Department of Agriculture. The main aim of the plan is the maintenance of healthy breeding flocks throughout New Zealand.

TABLE OF CONTENTS

Maha Illuppallama Agricultural Research Station in Ceylon	W. Freer	546
Radio Broadcasts		550, 604
Sterilised Milk	T. P. J. Twomey	551
Good Management is the Foundation of Profits in Pig Production	I. H. Owtram	557
Trace Element Deficiencies in Market Garden Crops	K. J. McNaught	563
Catching and Holding Household Poultry for Inspection	H. H. Watson	569
Vacuum Plant for Removing Excess Water from Honey	C. R. Paterson and T. Palmer-Jones	571
Shelter for Auckland Home Gardens and Orchards	H. A. Prew	579
Care of Livestock during July		588
Dairy Produce Graded for Export		588
Land Development: Chewings Fescue Seed (Seasonal Notes)		589
Elevator for Cleaning Poultry Houses	J. H. Jones	591
Recent Research Work: Tolerance of Pasture Grasses to T.C.A.		593
Trees on the Farm: Choice of Species	W. H. Jolliffe	595
Possibilities of Pampas Grass on Coastal Sand in Wellington Province	W. A. Jacques	599
Use of Lucerne for Grazing in Maniatoto County	W. A. Lunn	605
Value of Cropping in the Auckland District	J. E. Bell	609
Land Improvement: Increasing Production on a Bay of Islands Farm	N. A. Clarke	615
Meteorological Records for April		616
The Home Garden in July	A. G. Kennelly	617
Carpet Beetle Damage in New Zealand	R. G. Montgomery	629
The Versatile Scone Recipe	Evelyn E. Moore	631
Heat-sealing Plastics		636
Girl's Neat and Comfortable Cardigan		637
Simple Alterations to Give Better Kitchen Cupboards	Eleanor Couston	639
The Flower Garden	J. S. Say and K. H. Marcussen	647
Volume Index		654

New Zealand Department of Agriculture

HEAD OFFICE:
Dominion Farmers' Institute Building, Featherston Street, Wellington

DIRECTOR-GENERAL:
E. J. Fawcett

ASSISTANT DIRECTOR-GENERAL:
R. B. Tennent

DIVISIONAL DIRECTORS:

Animal Industry	J. E. McIlwaine
Animal Research	J. F. Filmer
Dairy	H. A. Foy
Extension	P. W. Smallfield
Horticulture	A. M. W. Greig

Editor: G. J. Neale

SUBSCRIPTION RATES

The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent, or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscription inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

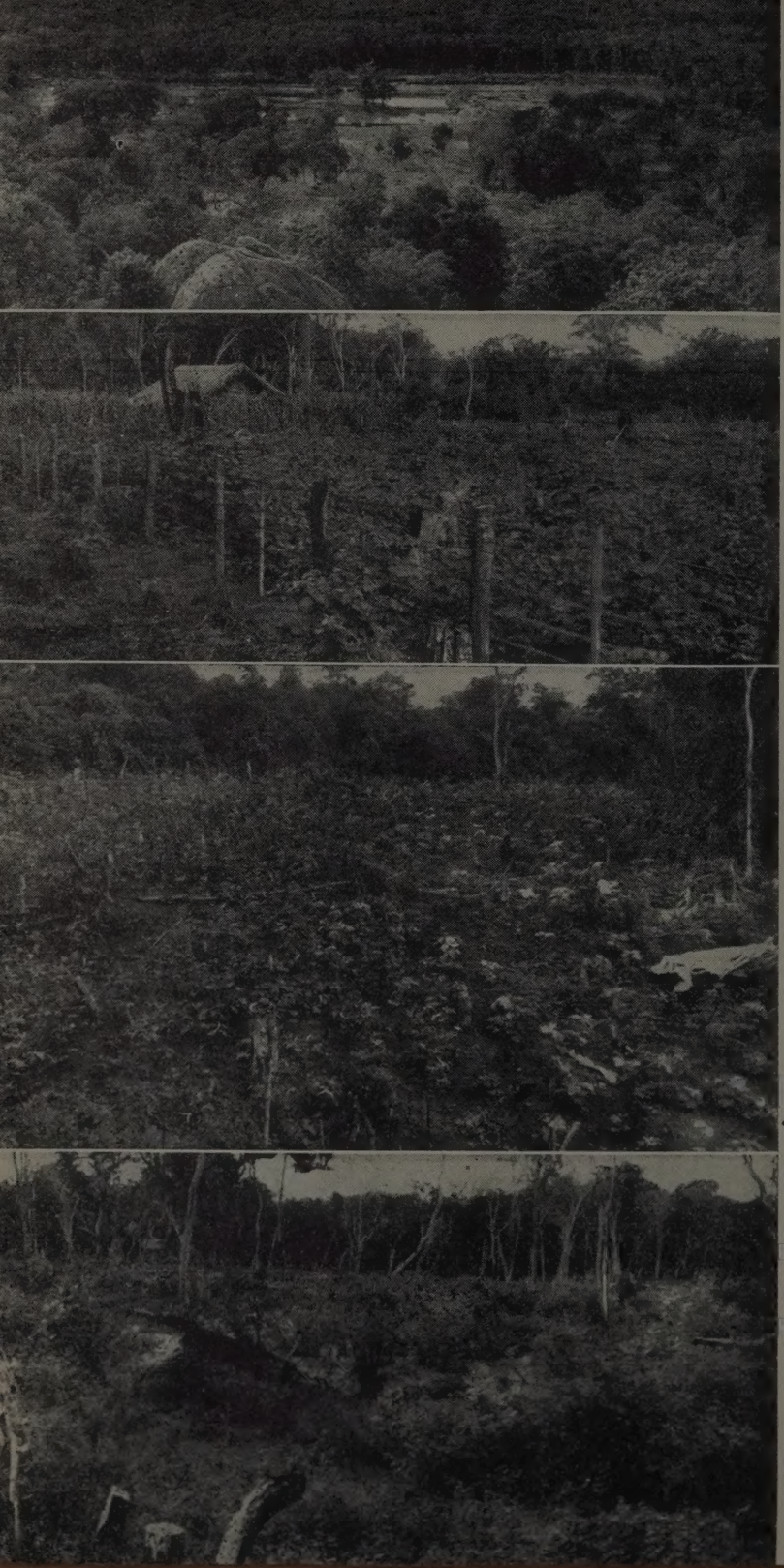
COPYRIGHT PROVISIONS

Articles in "The Journal of Agriculture" are copyright, but may be reprinted, **provided both the "Journal" and author are acknowledged.**

The Minister of Agriculture does not accept responsibility for any of the private and trade advertisements included in this publication.

All correspondence relating to the "Journal" should be addressed to the Editor, "The New Zealand Journal of Agriculture", P.O. Box 2298, Wellington.

REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE



N.Z.'s Practical The Agricultural

By W. FREER, M.P.

I HAVE just returned to Colombo after visiting a piece of New Zealand situated some 140 miles north-east of Colombo and on the edge of one of the largest remaining jungles of Ceylon. This was my second visit to the Agricultural Research Station at Maha Illuppallama, which has been largely financed by the New Zealand Government under the Colombo Plan. Three years ago while attending a Parliamentary Association Conference in Ceylon I was taken to the Station, so I was very keen to see what changes had occurred.

THOUGH my wife and I visited Maha Illuppallama at approximately the same date as my previous visit, on this occasion the countryside was saturated with an exceptional rain, whereas previously the area was parched.

In 1952 I had been very impressed with the orderliness of the experimental plots and with the absence of obviously neglected sections. But today my first impression was that, though the experimental plots appeared to be in good order, there were large areas of land which had a very neglected appearance.

My first impression, therefore, was that the station had deteriorated, but I subsequently found this was not so. In the interim the extent of soil depletion had been established, and as a result it has proved necessary for the research staff to allow unproductive areas to degenerate to return humus to the soil.

Closer examination revealed even to my untrained eye that great progress was being made here and that dis-

---

← Stages in maintaining soil fertility by chena or shifting farming. With this system the jungle is cleared, the land is cropped until the fertility drops in a few years, and the cropped area is allowed to revert to jungle again. Top—Typical jungle in the dry zone of Ceylon. The cleared area in the middle distance is a tank (reservoir) built centuries ago and later abandoned. Many of these tanks are being restored for provision of irrigation water. Upper middle—Vegetable crops growing the first year after the clearing of jungle. Lower middle—A clearing beginning to revert to jungle after the last crop has been removed. Bottom—Land reverting to jungle. The object of the Research Station is to find ways of keeping this land in production continuously.

Colombo Plan Aid

Research Station at Maha Illuppallama in Ceylon

DRY FARMING RESEARCH STATION.
MAHA ILLUPPALLAMA.
OPERATED WITH FINANCIAL ASSISTANCE
FROM THE GOVERNMENT OF THE DOMINION OF
NEW ZEALAND UNDER THE COLOMBO PLAN
TECHNICAL CO-OPERATION SCHEME.

coveries capable of overcoming Ceylon's food shortage were at hand.

Establishment of Station

Maha Illuppallama is situated in the northern provinces of Ceylon in what is known as the dry zone area. Eleven years ago it was covered in jungle and was a dangerous malarial locality. To have been sent to the dry zone a few years ago was considered very severe punishment; today it is a popular area with a rapidly increasing population.

With the extensive use of D.D.T. malaria is no longer a serious problem, and the clearing of the jungle has freed the area from the ravages of wild life, though periodically a wild elephant, leopard, or bear appears. Snakes are still very plentiful, but few fatalities occur.

The Research Station covers 840 acres, including 120 irrigated for paddy field experiments. It is bounded on one side by a jungle reserve of 2000 acres for future extension and on the other by an area of 64 acres on which an agricultural school for boys is being erected.

Below—Ceylon and South India. The location of Maha Illuppallama is shown by the cross.

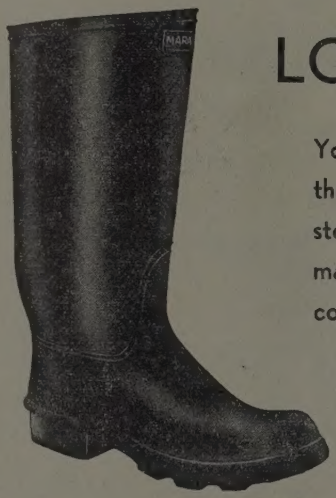
In 1950 the Ceylon Government decided to use the area, which had been a food production station at the end of the war, for research, and a grant of £500,000 to equip it was made by the New Zealand Government under the Colombo Plan.

Though experiments in rice cultivation date back to 1946, there has been considerable extension of the work since 1951. That year Professor Evan A. Hardy, of Canada, was sent to Ceylon by FAO to assist the local Department of Agriculture, and with his guidance the work has proceeded.

Some idea of the range of experiments can be gauged from the follow-

When you buy Gumboots

MARATHON GUMBOOTS



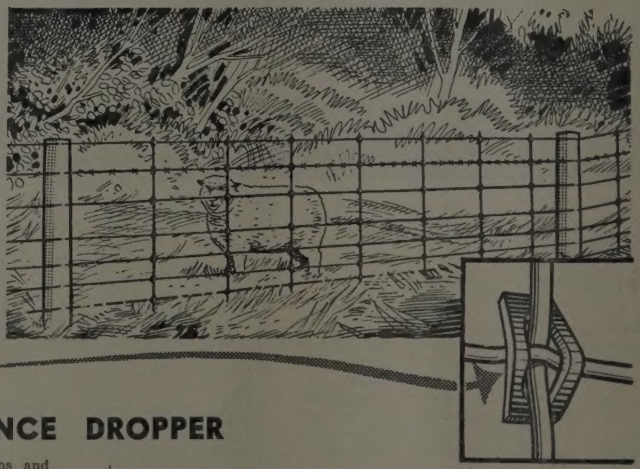
LOOK FOR THIS LABEL!

You buy gumboots for protection and comfort. You get these, plus value, with Marathon Gumboots. Step by step, Marathon Gumboots are made from the finest materials and by the most modern methods to ensure your complete and lasting satisfaction.

Made by:

MARATHON RUBBER FOOTWEAR LTD.,
A manufacturing Division of Skellerup Industries Ltd.
Cumnor Terrace, Woolston, Christchurch

Fast Light Lasting



THE DURAFENCE DROPPER

Here is the cure for sagging wire, rotting battens and hurt or escaping stock. Just fix the special patent clips to the wire. Drop in DURAFENCE DROPPERS. And your fence becomes a fort.

The Droppers are specially straightened No. 4 gauge "A" Grade galvanised wire in 3'10" and 3'7" lengths.

They are extremely light—100 Droppers weigh only 56 lbs., while clips to match, packed in heavy linen bags, weigh 16 lbs.

This lightness makes them ideal for transportation, particularly in hill country.

Tests conducted by Government Departments have proved that they are ideal for dropping from the air, a valuable asset in hill country.

Unlike wooden battens, they have no resistance to wind.

They are completely permanent. They will not rot and lose no galvanising in erection of fence.

The speed of erection saves labour costs, both on original erection and in the substitution for wooden battens on existing fences.

They are completely fireproof.

They do not tear wool from sheeps' backs.

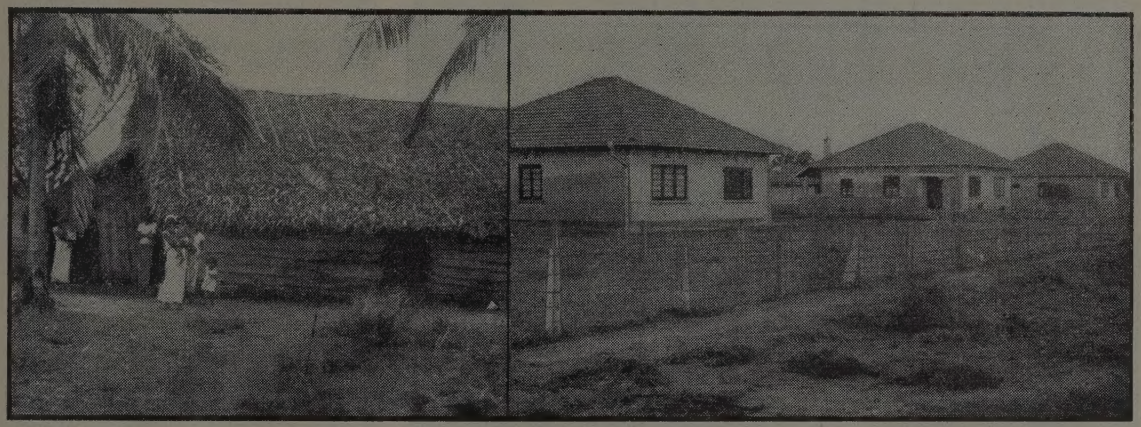
Seven clips are supplied with each Durafence Dropper batten and extra clips are available at low cost.

The price: £52 per 1000, including clips, plus freight from Wellington.

Made by TOMKIES MANUFACTURING CO. LTD., LOWER HUTT.

Marketed by the Farmers' Co-operative Wholesale Federation Ltd., Wellington, and handled by all Farmers' Co-operative Associations.

DD 1.55.



On the Research Station the workers' thatched huts (left) are being replaced by modern European-style houses (right).

ing list of crops under supervision at Maha Illuppallama: Cotton, chilli, cassava (a root tapioca), sweet potatoes, maize, ground nuts, soya bean, sorghum, millet, field beans, green gram (type of small pea), castor bean, green manures, cover crops, and highland or upland paddy.

In addition a herd of 120 cows is kept in conjunction with a modern piggery. Poultry experiments are also being developed.

Soil Fertility

Officers under the direction of the Chief Research Officer, Mr. E. Abeyaratne, and Professor Hardy have found that the apparently wasteful and primitive practices of agriculture in the tropics where land reverted to jungle after 3 or 4 years' cultivation were not as wasteful as originally thought. This waste was not a serious problem when populations were scattered and static, but under conditions of increasing population density the system was no longer stable or capable of providing the land urgently required for food production.

Some authorities have felt that the solution to the problem lay in resorting to a forest fallow by developing new methods of agriculture such as by using the plough, intercultivation implements, manures, fertilisers, and a conventional system of crop rotation. Experiments carried out over several years, however, have indicated that the solution is not so simple.

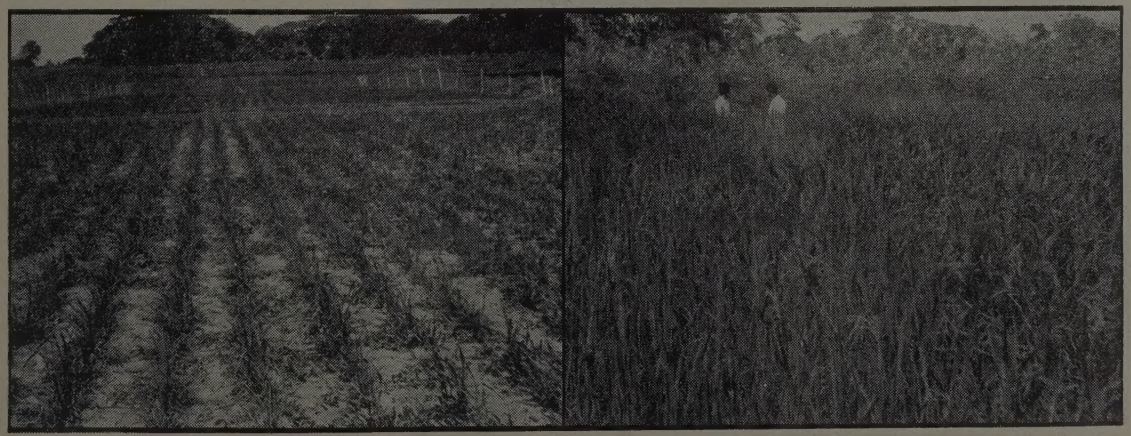
In tropical climates the rapidity of fertility depletion has proved to be much greater than originally contemplated. Humus disappears in a matter of weeks, and without humus large areas suffer severely from wind and splash erosion. The latter, though not so apparent, is far more dangerous, as it results in the gradual loss of important clay contents in the soil, and within a few years sandy desert will result.

That is why the clean cultivation which had impressed me in 1952 has been replaced by experiments with cover crops such as thornless mimosa in an endeavour to keep the ground covered. Results obtained after 3 years' experiments with cover crops and mulching have been very impressive.

Rice Production

Of major importance to Ceylon, where over half the rice consumed is imported, is the subject of rice production. In this sphere alone Maha Illuppallama has justified every penny spent on it.

Whenever one thinks of rice cultivation one automatically thinks of paddy fields and of the intricate systems of irrigation it requires. It came as a surprise therefore to learn that rice does not require continual water to grow; in fact it grows extremely well out of water.



Left—Upland paddy sown in 12in. rows. It is seeded before the rains and weeded by machines and hand until it is established.
Right—The same area before harvesting, showing the growth made after the application of fertilisers.

Studies are being carried out to ascertain the effect of cropping and fertilisers on soil losses. These plots of ground nuts have received different treatments.

The rice plant is very sensitive and will not make growth if affected by weeds, so that the flooding of the paddy fields was purely an effective means of weed control. At Maha Illuppallama we were shown paddy grown without irrigation and, as the lower illustrations on page 549 show, grow very well. Yields of up to 65 bushels an acre have been obtained during research, and if present experiments are as satisfactory as expected, it will be possible for Ceylon to double its present rice production.

Research officers are now concentrating on a type of highland paddy which can be sown immediately before the rainy season in rows along paths, irrigation banks, etc., and which will require minimum cultivation. It is to be hoped that their efforts will be completely satisfactory so that Ceylon, once known as the granary of the East, may again be self-supporting for this basic foodstuff.

Opening Ceremony

Since the Station was established temporary accommodation for administrative and laboratory work has been used. The well-designed but inexpensive permanent laboratories, offices, and library are now nearing completion, and an official opening ceremony will take place later this year.

Departmental officers are keen that New Zealand should be represented at the ceremony, and I trust that members of the Government, interested departments, or farmers' organisations will take the opportunity of visiting Maha Illuppallama, a spot in Ceylon which flourishes because of New Zealand aid.

Some of the Research Station's staff with Professor Hardy (fourth from right) and Dr. A. W. R. Joachim, the Director of Agriculture for Ceylon (third from right).

Poisons for Rats and Mice

SOME difficulty has been reported in obtaining the poisons named in the article "The Control of Rats and Mice" in the March issue of this Journal, and the Department of Health advises as follows:—

Warfarin and similar substances are available under a number of proprietary names and are obtainable at general stores and chemists. The pure substance to be mixed with suitable bait material is recommended in preference to prepared baits.

White arsenic can be sold only by chemists. The purchaser must be known to the chemist or must be introduced by someone known to the chemist and claiming to know the purchaser. A record of the sale, signed by the purchaser, must be kept by the seller and must show among other things the name, occupation, and place of abode of the purchaser and the purpose for which the poison is required. A sale by correspondence can be made if the letter gives the information necessary for records and if the purchaser's signature is either known to the chemist or is witnessed by a Justice of the Peace, police officer, or person whose signature is known to the chemist. The chemist is required to mix black colouring with the arsenic before selling it. He has the right to decline to sell the arsenic.

Barium carbonate also can be sold only by a chemist, but under less stringent requirements than apply to white arsenic. Not every chemist has stocks.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given from Station 1XH Hamilton during July as follows:—

11 July (12.33 p.m.)—"Preparations for Lambing", by G. R. Mackintosh, Livestock Instructor, Department of Agriculture, Hamilton.

18 July (12.33 p.m.)—"Results of Compost Trials", by K. J. McNaught, Agricultural Chemist, Department of Agriculture Soil Research Station, Rukuhia.

25 July (12.33 p.m.)—"Has the Dairy Farmer a Guaranteed Price?", by W. Petersen, Federated Farmers, Hamilton.

29 July (8.10 p.m.)—"Current Farming Problems", by panel of speakers.

Sterilised Milk

SHOULD sterilised milk be used to supply areas where milk treatment stations cannot be established for economic reasons? In this article T. P. J. Twomey, Superintendent of Market Milk Production, Department of Agriculture, Wellington claims that sterilised milk could well meet the needs of these areas, could in fact meet the needs of backblock dwellers, holiday campers, and travellers as well, and could offer a cheap and handy alternative to the use of the house cow. This article describes the product and shows how it could be fitted into the town milk industry in New Zealand.

THOUGH the town milk industry in New Zealand has now made a pasteurised bottled milk supply available to housewives in all towns but one with a population of 3000 or over, it has not been able to extend this supply to towns of smaller population or to country dwellers generally. The problem is one of economics and the solution cannot be found in the provision of more small milk treatment stations; nor can it be found in the transport of pasteurised milk over longer distances.

Technical Details

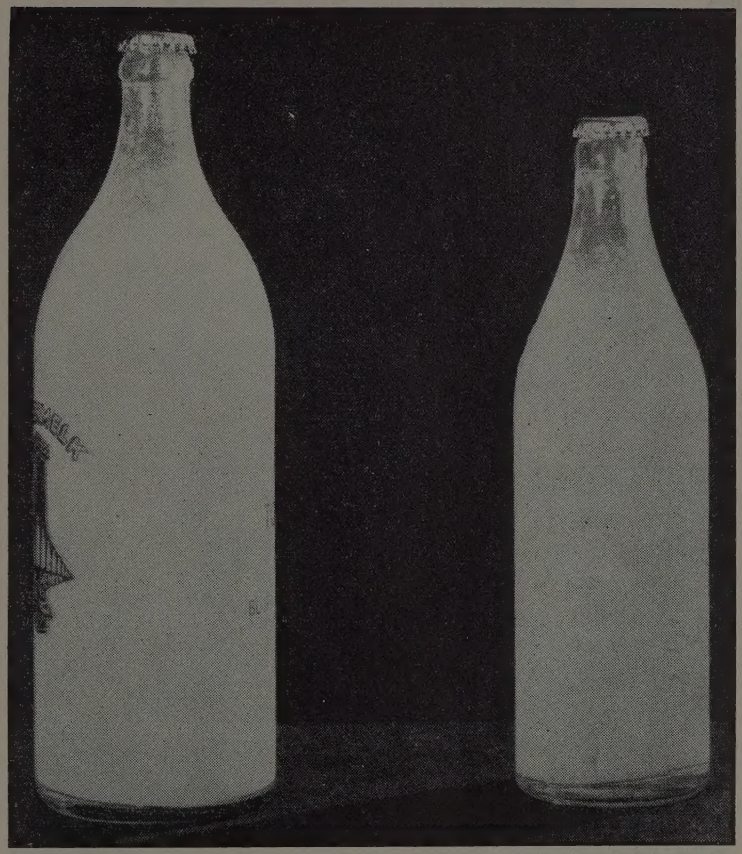
Full technical details about the production of sterilised milk can be obtained from the Dairy Division of the Department of Agriculture.

Pasteurised milk does not travel well and even under refrigerated conditions needs to be shipped daily. Rural areas can of course look to their local producer-vender or to the house cow to supply their needs, but the milk then needs to be boiled for safety. Canned liquid milk and dried milk offer a fair solution, but such products are not really cheap, nor are they as easily used as is ordinary liquid milk. The town milk industry can, however, fill this need by undertaking the production of sterilised milk.

What is Sterilised Milk?

Sterilised milk is ordinary milk which has been homogenised, clarified, filled into special types of bottles, sealed with a crown top (rather like that on a beer bottle), and heated to a temperature of approximately 220 degrees F. for 10 to 20 minutes under pressure. Properly prepared sterilised milk will last some months, requires no refrigeration, suffers no ill effects from exposure to sunlight, and can be transported over long distances without damage or loss of keeping quality.

The milk is widely used in England, where it is a standard type of milk in the industrial Midlands and in the north. It is growing rapidly in popularity in Europe. It has recently been introduced into South Africa and apart from this is also a regular article of commerce in West Africa, to which it is shipped regularly from England. One of the newest European milk plants has been equipped to produce 40,000 gallons of bottled sterilised milk a day.



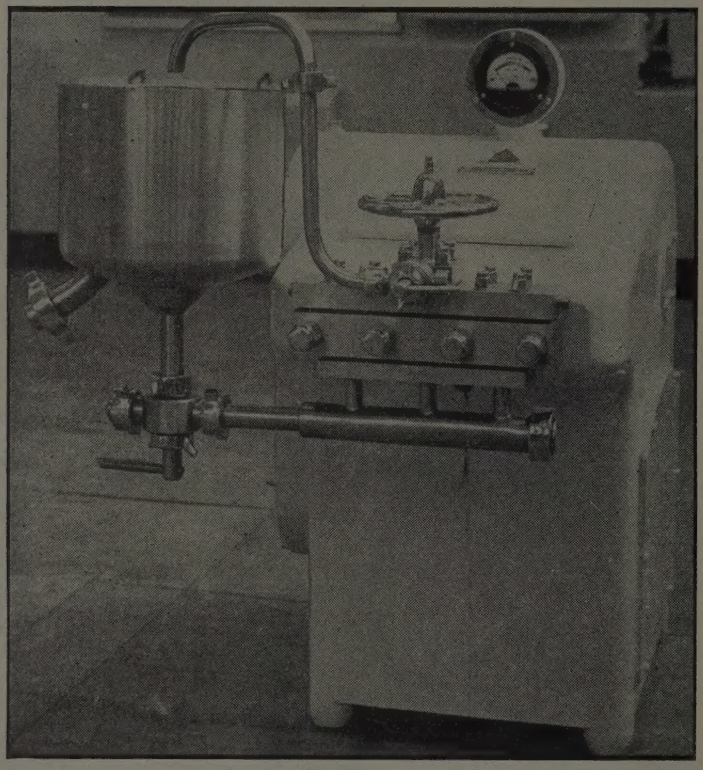
Two types of sterilised milk bottles. That at left holds 1 litre (1.76 pints) and is the standard size used in Continental Europe. That at right holds 1 pint and is typical of the bottles used in England.

When properly prepared, especially by the continuous sterilising process, sterilised milk cannot be distinguished by appearance from ordinary bottled pasteurised milk. It differs slightly in taste from ordinary milk, depending on the extent of the heat treatment applied to it in the sterilising process. As the high temperatures are applied under pressure, there is some tendency toward caramelisation and this can impart a faint cooked flavour to the finished milk. However, most users find this slight flavour difference attractive and it is well known in the milk business in England that once a customer changes over to sterilised milk he seldom if ever wishes to revert to ordinary pasteurised milk.

Sterilised milk keeps for long periods without refrigeration. Cases are on record where bottles of sterilised milk have been kept for several years and have been found perfectly satisfactory when opened after that lapse of time. As the sterilising process kills all except certain spore-forming bacteria in the milk, such keeping qualities should be expected. In practice, however, customers do not buy sterilised milk with the intention of keeping it for years, a common practice being to buy the milk once or twice weekly for day-to-day use.

Production of Sterilised Milk

Sterilisation is effected by subjecting milk to a high temperature under pressure. The process is applied to batches of milk or, where large quantities are involved, by one of the continuous sterilising systems. In the batch system a predetermined number



Sterilised milk must be homogenised. This homogeniser is of Dutch manufacture.

of bottles of milk is loaded into a pressure steriliser and steam is introduced to build up the pressure in the steriliser to 5lb. to 10lb. per square inch. The bottles are held in the steriliser for approximately 20 minutes, the whole process of loading, heating, holding, cooling, and emptying occupying about 1 hour. Sizes of batch sterilisers range from 50 gallons to 600 gallons per loading. The continuous system works on a somewhat different principle and is the method usually adopted for sterilising large quantities of milk. The method will be described later in this article.

Sterilisation cannot be used to make bad milk good and for this reason a good sterilised milk can be produced only if the milk to be sterilised is of the highest quality. Poor milk frequently harbours heat-resistant, spore-forming bacteria and such bacteria are not destroyed even with the temperature and pressure combination used in the sterilising system. Such milk will not keep even when sterilised. The first requirement for good sterilised milk is a good milk supply. New Zealand is fortunate in this respect, as the quality of its town milk is very high.

Stages in Process

After weighing and testing, the milk is heated to approximately 150 degrees F. and then clarified. Clarification serves the same purpose as does filtration in the process of pasteurisation. It is intended to remove any extraneous matter which may be in the milk. Some operators prefer to use ordinary pressure filtration methods instead of clarifying the milk and opinions differ as to which is the better method. Clarification removes any cells which may be in the milk, so that when in the next stage the milk passes to the homogeniser no cells remain to be precipitated in a layer at the bottoms of bottles when the milk is subsequently filled into the bottles and sterilised.

After leaving the clarifier the milk is fed into a homogeniser and homogenisation is effected in a single stage at a pressure of 2500lb. to 3500lb. per square inch. The homogenising process reduces the curd tension of the milk and breaks up the butterfat globules into minute cream droplets which cannot rise to the surface of the milk and form a visible cream layer. This process is essential in the production of sterilised milk, as under the temperature and pressure conditions of the sterilising process, a layer of cream at the top of the bottle would form a solid mass which could not be remixed with the milk no matter how much the bottle might be shaken afterward. From the user's point of view homogenisation serves to ensure that all of the milk has an equal food value, as the cream is evenly dispersed throughout the body of the milk.

Sterilised Milk Bottles

Ordinary milk bottles are not used for sterilised milk. For one thing the design of the standard milk bottle does not make it particularly resistant to heat shock; for another it is necessary as part of the sterilising process to raise the temperature of the milk above boiling point and this could not readily be done with the ordinary type of aluminium bottle cap. Further it is essential that once the milk is sterilised it should not be subject to any risk of re-contamination and for this reason a particularly rigid type of bottle top is necessary.

Sterilised milk is usually packaged in 1 pint bottles sealed with crown tops. The bottles are made of clear glass, but apart from this look like smaller editions of the standard beer bottle. Swing-stoppered bottles of the same type can be used in place of the crown-topped bottles, but swing-stoppered bottles generally have too much appeal to the housewife and too many bottles disappear as a result. For this reason they are now seldom used in the town milk industry. Cork-lined aluminium tops are a new development and appear to be as satisfactory as crown tops. Aluminium bottle tops can be removed more easily than can crown tops, for which a standard bottle opener is needed.

Though sterilised milk bottles can be washed in the same machines as are used for ordinary milk bottles, it is more usual to install a separate machine for them. The use of a separate washer is desirable, as sterilised milk bottles must leave the washer hot. To achieve this result the warm rinse and cold rinse have to be changed over to a series of final hot rinses so that bottles are heated up after the detergent rinse at 140 degrees F. to about 160 degrees F. This is necessary, as the milk leaves the homogeniser at a temperature of 160 to 170 degrees F. and milk at such a temperature could not be filled into cold bottles.

Filling takes place on a bottle-filling machine fitted with valves suitable for use with the taller, narrower-necked bottles used for sterilised milk. The fillers are not equipped with capping heads as are the fillers used for ordinary pasteurised milk. From the filling machine the bottles pass by conveyer to crown-topping machines, where the crown tops are applied and crimped on the bottles.

Once capping is completed the bottles of milk are placed in metal

crates. These are usually designed to hold a dozen pint bottles, though some operators prefer to use crates holding 20 bottles, the same number of bottles that are packed into the milk bottle crates used throughout New Zealand for pasteurised milk. In England sterilised milk is usually sold by the dozen bottles and this practice would appear to suit New Zealand conditions. In one Italian sterilised milk plant dozen-bottle crates are also used, even though Italy is a metric-system country.

Sterilising Process

Once the filled and crown-topped bottles are placed in the crate the sterilising process proper takes place. The batch system is used by the smaller operators and the continuous system by the larger.

Batch System

A batch steriliser is a simple but rugged apparatus and usually consists of a cylindrical or rectangular pressure vessel of mild steel and fitted with a braced and heavily clamped full-sized door for loading and unloading. A pressure steam lead is connected to the vessel and some designs are also fitted with automatic steam-injection holding and cooling-off devices. The vessel is arranged so that the crates of bottles when placed on a special metal tray can be wheeled into the vessel and at the end of the process removed on the same tray. The illustration below shows the loading operation in progress.

When the bottles and crates have been placed in the steriliser the door is clamped shut and steam is led into the vessel until the pressure rises to between 5lb. and 10lb. per square inch. At a pressure of 5lb. the temperature of the milk in the bottles reaches 222 degrees F. Once this temperature is attained it is held for 20 minutes and then the steam is turned off. A relief valve is then opened and pressure reduced to atmospheric pressure. At this stage the door is opened and the tray or trays of bottles wheeled out of the steriliser. No further processing is required and the bottles can remain on the trays until they are required for dispatch. The bottles need not be further cooled, nor need they be placed in cool storage. The steriliser can be reloaded immediately it has been emptied.

At right—Milk bottle fillers for sterilised milk are the same as those designed for ordinary milk except that the valves are suitable for the narrow-necked sterilised milk bottles and no capping unit is provided. The capping unit is always separate. Below—A typical batch-type milk steriliser. Sterilisers of this type can be supplied to hold up to 500 gallons of milk at a time in 1 pint bottles.

"Farm work made easy ... no repair work ... outstanding performance"

Writes ROTORUA FORDSON MAJOR Owner

"Over two years ago I was fortunate enough to be allocated a farm under the Rehabilitation Scheme, and naturally like all other young farmers starting off, it was not long before I was thinking of buying a tractor.

Having very little spare money I gave considerable thought to this purchase. Limited funds were available from the Rehabilitation Department to assist in the purchase of a tractor. After inspecting the tractors available I came to the conclusion that even though these funds were sufficient to buy a small tractor, I wanted a machine that would last for many years and would do everything required of it. After successful free demonstration on my farm I decided to buy the FORDSON MAJOR.

During the 18 months that I have had this tractor, I have used it on all my general farm work and I am more than satisfied with its *outstanding performance.*

The results over this period have shown me that I made the right decision. With the power and stability of this machine my *farm work has been made easy,* I have used the Fordson Major on all types of work, with a fuel consumption average of ¾ gallon an hour, and *no repair work.*

My advice to young farmers starting off is to buy a machine that will do *ALL* your jobs with ease. Buy a Fordson Major; it pays dividends in the end."

Sgd. P. G. PHILLIPS,
Reporoa.

SEE YOUR FORD DEALER! TEST DRIVE THE

UNBEATABLE VALUE.. from

£598 on Rubber

equipped with self starter, adjustable front and rear tracks, independent-foot brakes, handbrake.

▶ FORDSON MAJOR

FORD MOTOR COMPANY OF NEW ZEALAND LIMITED LOWER HUTT

367

VET-OSTELIN

will prevent ill-thrift (due to lack of Vitamin D) and ensure increased weight gain and full vigour during the winter months.

Vet-Ostelin is a product of Glaxo Laboratories who, in 1924, manufactured the world's first commercially available Vitamin D concentrate. Their experience in vitamin production, exclusive method of stabilising Vitamin D, and strict laboratory control ensure that each dose of Vet-Ostelin is fully effective.
To maintain the integrity of the product, each pack of Vet-Ostelin includes a date beyond which the preparation should not be used.

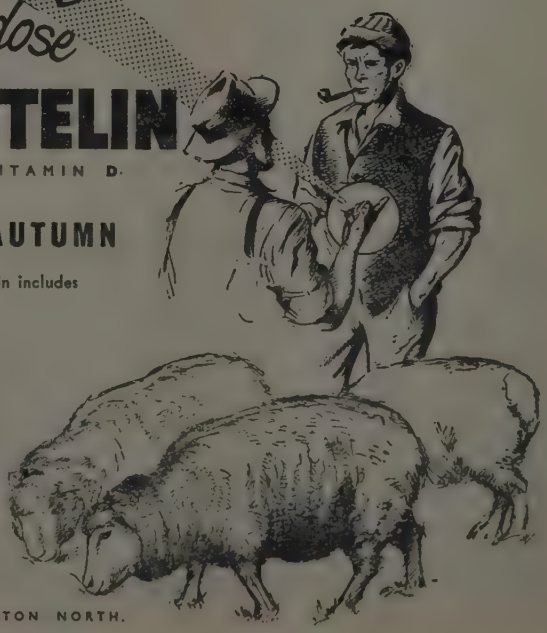
just one dose

OF

VET-OSTELIN

CALCIFEROL VITAMIN D.

GIVEN IN AUTUMN



DRENCH

Bottles of 16oz. enough for 32 sheep.
Tins of 40oz. enough for 80 sheep.
Tins of ½gal. enough for 160 sheep.
Tins of 1gal. enough for 320 sheep.

TABLETS

Bottles of 25 enough for 25 sheep
Tins of 100 enough for 100 sheep
Tins of 300 enough for 300 sheep

INJECTION

For use with standard injection equipment.
Sterile bottles of 540cc. enough for 270 sheep.

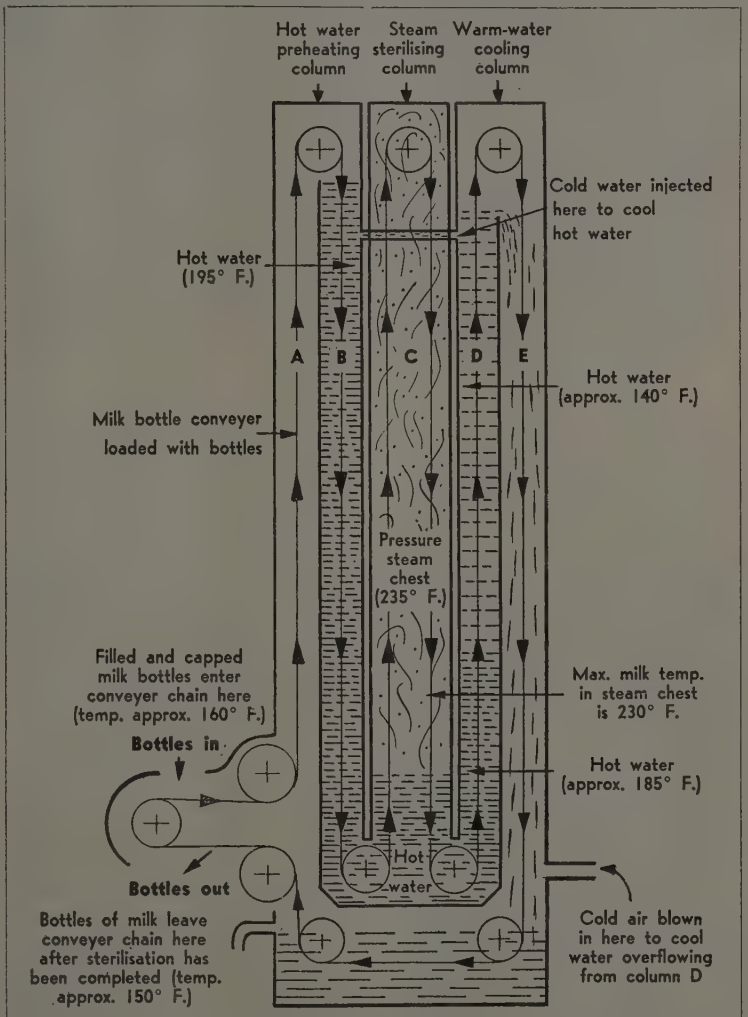
Available from your usual farm supplier!

GLAXO LABORATORIES (N.Z.) LTD., PALMERSTON NORTH.

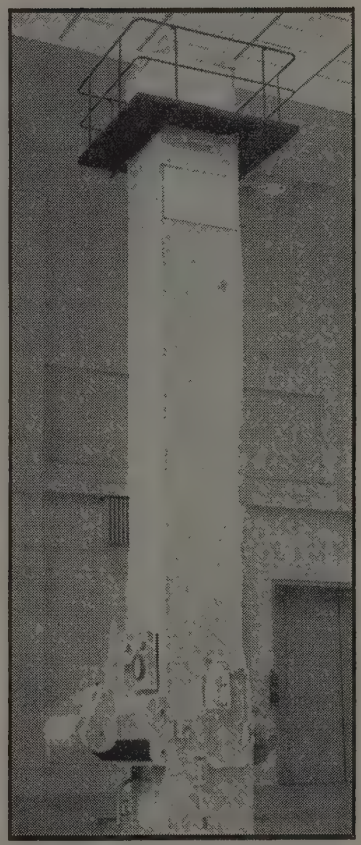
Continuous System

A continuous sterilising process is applied to the filled and crown-topped bottles in the same way as in the batch system, except that the bottles are not placed in crates but are put individually in pockets in the steriliser. A continuous steriliser is a most impressive piece of machinery between 30ft. and 40ft. high which may occupy a space at its base of a fairly large room, though in some of the new Continental types (see illustration at right) the base area is comparatively small. The unusual height is required because of the need for providing a water seal sufficient to sustain a pressure of up to 10lb. per square inch. The principle on which the machine works is explained in the diagram below.

When the continuous sterilising system is used bottles proceed direct from the filler to the crown topper and then on the same conveyer into the continuous sterilising machine. When they leave the machine 30 minutes later they move automatically by another conveyer to an assembly table, where the bottles can be examined and then placed in crates. In the continuous system the bottles leave the steriliser at a reasonably low temperature and can be handled immediately. In the batch system bottles as they leave the steriliser are too hot to touch.


Hot water preheating column
Steam sterilising column
Warm-water cooling column
Cold water injected here to cool hot water
Hot water (195° F.)
A
B
C
D
E
Hot water (approx. 140° F.)
Milk bottle conveyer loaded with bottles
Pressure steam chest (235° F.)
Filled and capped milk bottles enter conveyer chain here (temp. approx. 160° F.)
Max. milk temp. in steam chest is 230° F.
Bottles in
Hot water (approx. 185° F.)
Hot water
Bottles out
Bottles of milk leave conveyer chain here after sterilisation has been completed (temp. approx. 150° F.)
Cold air blown in here to cool water overflowing from column D

Cross-section of continuous steriliser shown at right. Filled and capped bottles are placed on the bottle conveyer and enter the machine as shown. The conveyer then takes them up through the air column (A) and down through a hot-water column (B), where they are preheated to 195 degrees F. Next the bottles are taken up and down through the steam column (C), where they are sterilised, up again through a hot-water column (D), which is less hot than column B, for precooling, and down through column E for further cooling by cold-air-cooled water overflowing from column D. Bottles finally are delivered at the point shown. The whole cycle takes just over an hour.



A continuous milk sterilising machine. Though the machine is over 30ft. high, it occupies little floor space and only one operator is required. This machine has a capacity of about 500 gallons of milk an hour.

Intermediate System

In the batch system of sterilising the bottles are heated by direct contact with live steam. In the continuous sterilising system the bottles are heated by direct contact with hot water and to a less extent through contact with steam. An intermediate system of sterilising has been developed by a Dutch firm of dairy engineers. The machine works on the batch system, but is so arranged that the bottles are heated in agitated contact with hot water and steam. This machine is designed particularly for small operators who may not wish to install the more expensive large batch sterilisers or the very expensive continuous sterilisers.

The choice of a steriliser is influenced by the number of gallons of milk to be sterilised each time. Where sterilised milk constitutes a regular portion of a milk plant's business it has to be produced every day and the decision is made on the number of gallons likely to be handled. As sterilised milk is unlikely to form a large part of the daily business of a New Zealand milk plant, local milk treatment stations probably will not need to consider installing large and expensive continuous sterilisers. For a milk plant handling up to 4000 gallons of sterilised milk a day two or three 500-gallon batch sterilisers would give adequate sterilising capacity. For a gallonage over 4000 a continuous steriliser might be warranted, but the relative costs would have to be examined closely. For a sterilised milk demand of 1000 gallons a day two 300-gallon sterilisers or perhaps one 500-gallon unit would suffice. Much depends on the number of hours for which the sterilising process would have to continue each day; the bigger the sterilising units are the quicker the day's sterilisation can be completed.

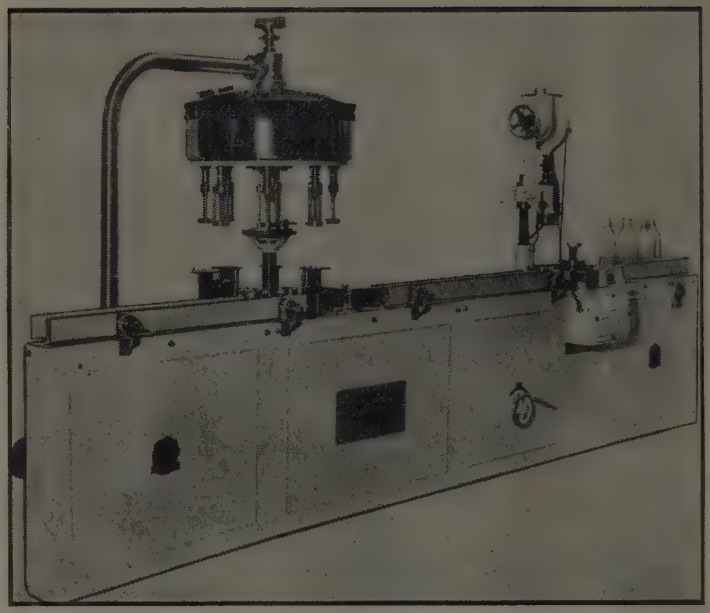
Cost of Sterilised Milk

Sterilised milk in England, where milk is not as rich in butterfat as it is in New Zealand, does not have a standard butterfat content, but the Dutch find it advantageous to set the butterfat content at 2.5 per cent. In New Zealand it would be desirable to follow the Dutch example, though the butterfat content could be set higher. Sterilised milk appears creamier than ordinary milk, and in any case the high butterfat content of New Zealand milk raises certain technical problems in sterilisation. The point is of consequence apart from the technical angle, however, as the adoption of a standard fat content can help to keep the cost of the product at a reasonable level. In fact standardisation to the Dutch figure of 2.5 per cent. would probably enable sterilised milk to be sold at the same price as ordinary pasteurised milk.

Some costs for the plant and equipment used in the production of sterilised milk are set out below, the costs being based on a daily demand of 500 to 1000 gallons:—

	£	£
Bottle washer ..	1000 to	2000
Bottle filler	600 to	1500
Crown topper ..	700 to	1500
Bottle and crate conveyers	200 to	800
Crate rinser	200 to	600
Steriliser (batch type)	1200 to	2500

Suitable bottles and crates should not cost more than the bottles and crates used for ordinary milk. However, caps would be considerably dearer, as crown tops are six to eight times as dear as ordinary aluminium milk bottle caps. The aluminium sterilised bottle seal, however, may offer some economy.



A complete sterilised milk bottle filling and crown-topping arrangement. The filling and sealing units are connected by a short length of bottle conveyer.

Use for Sterilised Milk in N.Z.

Sterilised milk affords an opportunity to New Zealand's town milk industry to tap markets it has not so far been able to serve. Apart from offering a service to people in the more remote urban areas, sterilised milk would meet the needs of rural and backblock dwellers, timber camps, holiday centres, motorists on tour, and transport workers generally. Sterilised milk could be made available through country stores and it would then be easy for country customers to collect a couple of crates of milk on the weekly visit to town.

It should not be necessary to establish many sterilised milk plants in New Zealand. As transport is not a problem with sterilised milk, plants could be installed to serve quite extensive areas. There would appear to be a case for sterilised milk plants being installed in existing treatment stations in Auckland or Whangarei to serve Northland, Hamilton to serve the King Country, Rotorua or Whakatane to serve the inland areas of the Bay of Plenty, Gisborne to serve the whole of the Gisborne area, Hastings to serve Hawkes Bay, Palmerston North or Wanganui to serve parts of Taranaki and the north of Wellington Province, Blenheim to serve Marlborough and the Sounds, Greymouth to serve south Westland, Christchurch to serve inland Canterbury, and Dunedin to serve the whole of Otago. The most likely immediate demand might be expected to centre on plants in Hamilton or Rotorua, Hastings or Gisborne, Christchurch, Dunedin, and possibly Greymouth.

Demand should Grow

It is impossible to assess the likely demand for sterilised milk. Nevertheless it is fair to assume that once the product is available the demand will grow automatically. Though sterilised milk would be introduced mainly to meet the needs of country dwellers, it could be expected that many city dwellers would wish to buy it. Its keeping quality in hot weather may prove an attraction to such users.

Then, too, sterilised milk could just as easily be transported to the Island Territories as to a New Zealand country town. It is already being shipped regularly from Southampton in England to Nigeria in West Africa, and shipment to the Pacific Islands from New Zealand would offer no more problems than shipment from England to Africa.

Sterilised milk was first produced commercially in England 60 years ago. It has continued to sell, and sell well, all these years. New Zealand need not then be afraid that sterilised milk is something too new to adopt; its introduction raises no technical problems that cannot readily be solved. Sterilised milk could extend the usefulness of the town milk industry to consumers and could help the industry to tap a market that up to now has been out of its reach.

Good Management is the Foundation of Profits in Pig Production

THE answer to falling prices for pig meat is to increase the profit margin by more efficient production. In this article I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington, points out that fast growth-rate in pigs is essential to lower costs of production and can be achieved by careful selection of breeding stock and the best possible care of sows and litters to ensure heavy weaning weights.

TO offset the drop in the price of pig meat that has taken place during the last few months the farmer should do everything he can to ensure that his profit margin on the pigs he produces is as large as possible. The producer's profit depends largely on the food conversion rate of his pigs or on how many pounds of food it takes to produce 1lb. of pig meat. Generally the pig that reaches finished bacon weight in 6 months uses less food to do this than the pig that takes 7 months to reach the same weight under the same feeding conditions. Two factors are of great importance in achieving a fast growth-rate: One is that growth-rate is, up to a point, an inherited factor, and the other, which is of greater importance, as it can largely be controlled by management, is that litters of pigs should have a heavy weaning weight at 56 days old. Light and poor-quality weaners nearly always take longer to reach finished porker and baconer weights than do good, heavy weaners.

Inherited growth-rate is a very important point in the selection of breeding stock. When breeding stock are being bought information should always be sought on the growth-rate and litter production records of the strain from which it is proposed to buy. A breeder who is unable or unwilling to give this information should be avoided.

The production of heavy weaners is almost entirely a matter of good management of the sow before farrowing and of the sow and litter when the litter is still on the sow. The pig that weighs 40lb., at 56 days old has an enormous start over the pig that weighs only 30lb. and, given the same management and feeding, will nearly always be first in the race to porker or baconer weight. Experimental work has conclusively proved that the weight pigs put on while still suckling the sow, and particularly the weight they put on after they start feeding in the creep, is the cheapest weight that they ever put on, because it takes less food for 1lb. liveweight increase at this time than at any other time in the pigs' lives.

The Sow before Farrowing

At this time of the year sows are farrowing their winter litters and

HEADING PHOTOGRAPH: The farmer's profit margin on his pigs depends on large litters of strong pigs that are weaned when at least 40lb. average weight and that grow rapidly without any check to porker and baconer weight.

Individual feeding bails for dry sows.

Care in Vaccination of Sheep

Undue blemishing of sheep carcases or pelts may be avoided by care in vaccination and proper selection of vaccination site. Special care must be taken to avoid piercing muscle tissue as this may cause a severe reaction.

Lambs and young sheep

These should be vaccinated at the base of the neck, below the throat but just above the point of the brisket, by pulling out a fold (tent) of skin and inserting the needle beneath the skin.

Older animals

may be vaccinated behind the shoulder (see illustration) as, with a longer interval between vaccination and slaughter there is less risk of a blemish remaining at slaughter.

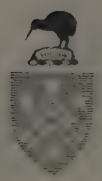
USE **TVL** BLACKLEG AND PULPY KIDNEY VACCINES

TASMAN VACCINE LABORATORY LIMITED

IF YOU ARE NEW TO FARMING . . .

IF YOU ARE FARMING IN A NEW AREA . . .

TALK THINGS OVER WITH THE LOCAL BNZ MANAGER



Call on him in strict confidence and without obligation. The facilities of the Dominion's largest Bank — and the "know how" of nearly a century of coping with local problems are at your disposal. Why not avail yourself of them?

BANK OF NEW ZEALAND

At the service of primary industry since 1861

2.5C

many more will farrow during the next 2 months. How can the farmer make sure that these litters will grow as fast as possible? First, the sow must have reasonable care and attention while carrying the litter if she is to do a good job and produce a large, live litter of pigs. Far too often sows, when their litter has been weaned, are turned out to fend for themselves until the next litter is due. In-pig sows should certainly have as much free range as it is possible to give them, as exercise is very important, but they must be adequately fed if good results are to be obtained.

When a litter is weaned the sow should be taken away from the litter, which should be left in the farrowing quarters for a week or 10 days, and put into a pen by herself and fed at least 5 to 6 food units a day. A sow will normally come on heat 3 to 4 days after weaning and should be put to the boar 24 hours after this and again 24 hours later. As soon as the sow is settled she can be put with other dry stock. A good sow always loses a certain amount of weight while suckling a litter, and frequently this is not noticed by her owner, who sees her every day. It is most important that this lost weight should be put back on the sow during the first 6 weeks after weaning.

Piglets suckling the sow in the round farrowing house. The piglets are within the warmed area of the safety zone while suckling. Note the infra-red lamp.

Sows and litters should have access to good pasture at all times when the weather is suitable.

It costs no more for FORD quality

"POWER PLUS"

GENUINE Ford BATTERIES

The Power Plus Batteries for every make of car, truck, tractor

Eight types,
7 TO 15 PLATES

FORD MOTOR COMPANY OF NEW ZEALAND LIMITED LOWER HUTT 369

PROTECT
Winter Food

RATION
Winter Pastures
with
The Portable "BELL"

WOLSELEY ELECTRIC FENCER

Avoid damage to unfenced haystacks with a Wolseley Electric Fencer . . . can be erected in a few minutes with a minimum of effort. And you'll find a noticeable increase in winter grazing, too, with the aid of this outstanding British Electric Fencer . . .

HERE IS JUST ONE TYPICAL TESTIMONIAL . . .

"I would like to say how pleased we are with the performance of our Wolseley Fencers. We have been using them continuously over a considerable period of time, and have had no trouble at all. We particularly appreciate the ease with which the fence can be moved, one man can do it in a matter of minutes, a great asset with the present labour shortage. These fencers have undoubtedly saved us a considerable sum of money in fencing costs and, in short, I have no hesitation in recommending it to other farmers."

You, too, can make the same saving in time and money AND INCREASE YOUR PRODUCTION !

Order from all Branches of . . .

Dalgety
AND COMPANY LIMITED
(Incorporated in England)

Litters like this mean good profits from pigs.

If a number of sows, and possibly a boar as well, are fed together in one trough, the strongest always get more than their share and so the object of putting condition back on to freshly weaned sows is often defeated. The best way to avoid this difficulty is to provide feeding stalls and a subdivided trough. These prevent fighting and ensure that each animal gets an equal chance. If this cannot be done, it is a sound plan to have a separate feeding yard where freshly weaned sows can be fed until they have regained lost condition.

Once sows have regained this lost weight their ration can be cut down to 2 to 3 food-units per day, plus, of course, free access to as good grazing, preferably clover pasture, as it is possible to give them. A month before they are due to farrow rations should again be stepped up to 5 to 6 units a day, as by this time the demands of the unborn litter on the sow are becoming considerable. Skimmed milk or whey can be used if they are available. Whey, of course, should be supplemented with 1lb. to 2lb. of meat meal. If no dairy by-products are available and dry sows have to be fed on home-grown root crops, these should be supplemented by 1lb. to 2lb. of meat meal and grain per day. Home-grown barley and maize are, of course, invaluable.

If dry sows have been kept in good condition and allowed plenty of exercise with as good grazing as possible, and are provided with a warm, dry house in which to sleep, they will have every chance of providing good litters of strong, healthy pigs. Housing for dry sows need not be very elaborate, as adult pigs are not nearly as susceptible to temperature changes as are young pigs. Access to clean drinking water must be provided at all times, especially when little skimmed milk or whey is available.

Farrowing

Sows should be put into their farrowing quarters at least a fortnight before they are due to farrow so that they will have time to settle down. The essential points of a farrowing house are that it should be warm and dry and capable of maintaining as even a temperature as possible. Attached to the house should be a feeding yard the design of which may be varied to suit individual requirements. The round farrowing house developed at Ruakura has proved very satisfactory. The central safety zone for the piglets, warmed by an infra-red lamp, is in such a position that the piglets go there automatically and the shape and design of the house is such that the sow must lie down with her udders toward the central brooder. The house should be built of good insulating material and the insulating of the roof is very important. One point must be realised by anyone who is building these round farrowing houses, and that is that the measurements of the house as given in the article published in the "Journal of Agriculture" for September 1954 must be strictly

adhered to; otherwise the whole object of the design is defeated. The success of the house depends on the fact that the sow can lie down in only one position, though she can face either way. In fact, the house is tailored to fit the sow, and any deviation from the original design spoils its effectiveness.

When the sow is on the point of farrowing she should be confined in the house at night by a light hurdle across the door to prevent her farrowing in the yard outside, which, at this time of year especially, is usually disastrous for the litter. Sows should be provided with a little bedding; clean straw or wood shavings are good; hay should be used sparingly, as newly born piglets are apt to get tangled in it. Food should be given very sparingly immediately before and after farrowing; in fact, for 24 hours before and after farrowing probably the best plan is to provide nothing but plenty of clean drinking water. If the sow is quiet enough to be handled when she is farrowing, it pays to give her attention; piglets that would otherwise be lost can then be saved. However, if she resents anyone being near, it is better to leave her alone, as more harm than good will be done by trying to assist her.

The Litter

During the first week after farrowing the sow's rations should be gradually increased until she is receiving at least 4 food units for her own maintenance and ¾ unit for each pig in the litter. Drinking water should always be available. If the weather is suitable, the sow and litter should be let out for a run on good pasture as soon as the piglets are running round. If the weather is bad, a clean sod of turf should be dug and put into the feeding yard for the piglets. A run in the paddock, or failing that provision of turf as described, as soon as possible after farrowing is a good insurance against trouble from anaemia.

Warmth is all important for piglets during the first week. The infra-red lamp, such as is used in the Ruakura round house, should be used from just before the sow begins to farrow. This lamp must be fitted so that the height above the floor can be adjusted to give a temperature of 75 degrees F. at floor level in the brooder or safety zone. The height of the lamp will have to be varied according to the weather; in cold, frosty weather it will have to be lower than in mild weather. The lamp should always be left on for the first week. After that it depends very much on the weather how much it should be used; it may not be necessary at all or it may be required at night only.

During the first 3 weeks of their lives the piglets rely entirely on the sow's milk. From 3 weeks onward they will take increasing quantities of other food and this should be fed in a creep. A creep, simply described, is somewhere where the piglets can go to feed and the sow cannot. The creep should be as near the sleeping quarters as possible so that the piglets may be coaxed into it. It should also be roofed over to prevent meal being spoiled by weather. A certain amount of guile and persuasion may be necessary to start piglets feeding in the creep at an early age, such as shutting the sow away from the litter for an hour or two; laying a trail of dry meat meal into the creep; or using pellets made of meat meal and fat. A good idea also is to provide a pint or two of warm milk straight from the cow.

Meal and skimmed milk should be fed in the creep. Meal should be fed dry, and the use of a self-feeder is recommended so that meal is always available to the piglets. Milk should be fed in a low trough so that the piglets will have no difficulty in getting at it. To start, dry meat meal should be used. This is both easily digestible and valuable in promoting rapid growth. Piglets usually will take dry food before they start taking extra milk. When the litter is about 4 weeks old a meal mixture of one-third meat meal and two-thirds barley meal can be used in the self-feeder.

The use of a self-feeder is important, as it has been found that when meal is always in the creep the piglets will visit the creep after every suckling and take a little meal, and as they suckle the sow approximately every 1½ hours throughout the 24 hours, it will be obvious that they will be able to eat more food if it is always there for them. This is the time of their lives when it is most important that they should eat the maximum amount of food, as it is at this time that they make the best use of it in putting on weight. Good, heavy weaners are the foundation of good profits from pigs and it is not difficult to produce 40lb. weaners if a little care is given to the sow and litter.

Boar pigs should be castrated at 3 to 4 weeks of age, when little check will be experienced. Care must be taken to avoid any check at weaning. It is no use producing good weaners if they go back after they have been weaned. At weaning the sow should be taken away from the litter and the piglets should be left in their farrowing quarters for at least a fortnight. When they are moved into fattening quarters it is much better if the litter can still be kept together. The use of a little fat in the ration at weaning time is a good idea for preventing any check. An ounce of fat a day fed in the creep for a week or 10 days before weaning, and then increased at weaning to not more than 4oz. a day, is a good insurance against pigs' losing the bloom that good weaners have.

The farmer's profit margin on his pigs depends on large litters of strong pigs that are weaned when at least 40lb. average weight and that grow rapidly to porker and baconer weight without any check. By selecting breeding stock from strains of which the performance is known and paying careful attention to the sow and her litter and seeing that the pigs receive no check at weaning, the producer can be assured of a satisfactory result.

Weed Control in Dairy Pastures

DAIRY pastures often become weed infested because of their management. The greater length at which dairy pastures are grazed and the opening up after grazing encourage the establishment and growth of the taller growing weed species.

Control measures should be started before the pasture is sown. Frequent harrowing should be carried out before sowing to kill germinating weed seedlings. The seed-bed should be in good order so that all seeds germinate and only seed of the most suitable grade and of known purity and germination should be sown. When established the pasture should be kept dense and vigorous by adequate topdressing, drainage, and good management.

A dense pasture acts as a smother for many types of pasture weeds. Even under the best management, however, weeds come in, particularly in older pastures. Topping should be done wherever possible to prevent weeds seeding. Often a silage cut will remove many ripening seed heads before seeds are shed.

Docks and buttercups present a serious weed problem on many farms and could be classed as the worst weeds of dairy pastures. Docks are essentially a weed of high-fertility areas and under dairy management they thrive, producing large quantities of seed. A fairly good control can be obtained by using the polyethylene glycol ester of 2-4,D or "P.E.G." as it is commonly known at 1lb. to 2lb. acid equivalent per acre for seedlings and 2lb. to 3lb. per acre applied at the late flowering stage for mature docks. Since this formulation is very toxic to clovers, pastures should be well grazed before it is applied.

Buttercup, especially *Ranunculus acer*, invades pastures which have been pugged and lie wet in spring. A weak, run-out pasture generally suffers from buttercup infestation. Control can be obtained by spraying before flowering with 1lb. to 2lb. per acre of an M.C.P. salt. Materials based only on the 2, 4 isomer content such as "Agroxone 4" and "Weedar M.C.P. 4" should preferably be employed. Subsequent management should be aimed at strengthening the sward by oversowing and topdressing.

—*B. A. J. SMITH,*
Fields Instructor,
Department of Agriculture,
Palmerston North

Trace Element Deficiencies in Market Garden Crops

SYMPTOMS of trace element deficiencies in vegetables in New Zealand are sometimes very marked, and the effect of this factor on the market gardening industry has been investigated by scientific workers. In this article, adapted from a paper presented at the Eighth New Zealand Science Congress last year, K. J. McNaught, Agricultural Chemist, Department of Agriculture's Rukuhia Soil Research Station, Hamilton, discusses scientific evidence on trace element deficiencies in vegetables in New Zealand and concludes that market garden crops may suffer less from such deficiencies than do pastures and farm crops because of gardeners' heavy applications of fertilisers, particularly organic fertilisers, which contain these trace elements.

INCLUDED in this discussion are results of research on glasshouse tomatoes and on crops such as swedes, which are used both as animal fodder and as vegetables. Magnesium, sulphur, and sodium are treated as trace elements, though they are taken up by plants in relatively large amounts.

Boron

Boron deficiency in brassicas is widespread, as is indicated by the occurrence of brown heart or mottle heart of swedes and hollow stem or split stem of cauliflowers, broccoli, cabbages, and brussels sprouts. Brown heart in swedes has been investigated in Nelson by the Cawthron Institute and in other districts by the Department of Agriculture. In 1936 and 1937 satisfactory control was reported from nearly all broadcast applications of 10lb. to 20lb. of borax per acre before sowing in Southland, Central Otago, Westland, Poverty Bay, Rotorua, and Waikato. Cawthron Institute workers in 1937 showed reduced incidence of brown heart in turnips and swedes in the Nelson district from applications of 10lb. to 56lb. of borax per acre, and chemical analyses showed some relationship between the incidence of brown heart and the boron content of plant tissues. In 1939 good results were obtained in the South Island and at Rotorua, but in the King Country and Hawkes Bay borax appeared to have little effect. It was concluded that a minimum application of 15lb. of borax per acre will usually give satisfactory results.

In 1948 it was found that the characteristic cracked stem symptom in celery was prevented by the application of 30lb. to 40lb. of borax per acre applied 6 days before planting. This trouble frequently occurs in the Auckland district, especially on the volcanic soils, and in all cases satisfactory results have been obtained from the use of 20lb. to 30lb. of borax per acre.

In cauliflowers and broccoli the deficiency seriously affects quality of the curd, giving a distorted head with brown or black rotted areas. The tips of new growth leaves often show distortion or scorch. Such symptoms are frequently noted in cauliflower crops in New Zealand, but no critical ex-

HEADING PHOTOGRAPH: Molybdenum deficiency. In investigations of whiptail of cauliflower large growth responses were obtained after molybdenum application, and it was shown that ammonium molybdate at 5lb. per acre corrected this disease. The present recommended rate is 1lb. of sodium molybdate per acre.

HAMILTON

LA FARM LOADERS

FOR FORDSON & FERGUSON TRACTORS

THESE low-cost loaders are invaluable for many types of jobs around the farm. Designed primarily for light duties they have ample strength and lifting capacity for such jobs as loading loose shingle and dirt, excavating, loading baled hay, and similar lifting jobs.

ATTACHMENTS FOR LA LOADERS

Matched attachments available for the LA Loader are Dozer Blade and Hay Sweep. A Push-Off Stacker is also available for the FORDSON model. These attachments can be quickly fitted and easily changed.

Write for further details to the Manufacturers —

C. W. F. HAMILTON & CO. LTD.

Box 709, Christchurch. Telegrams "HYDRAULIC"

Fit a SHEAROMATIC HEDGE CUTTER and ROMAC AIR COMPRESSOR TO YOUR TRACTOR

Goes to work quickly, cleanly, easily on hedges (even with 12 months' growth), ditches, verges, undergrowth, underwater weeds, trees, etc. Use the Romac Air Compressor for spray-painting farm buildings with paint, creosote or whitewash. Romac inflates tractor, truck and car tyres . . . fits Ferguson, Nuffield, David Brown, Fordson Major and can be adapted for any other crawler or wheel tractor.

The Shearomatic is a really practical, one-man hedge-cutter, driven, cleaned and lubricated by compressed air.

N.Z. Distributors:

Ivory Bros. Ltd.

P.O. BOX 1321 WELLINGTON

THERE'S AN AGENT IN YOUR AREA FOR SALES & SERVICE

periments have been reported. For these symptoms advisory officers generally recommend application of 15lb. of borax per acre as is done with swedes, but this rate may be too low on some soils, especially those subject to high rainfall or summer drought.

In the Auckland area poor crops of lettuces have been noted, the plants showing distortion and burning of the tips of the leaves. The trouble has been remedied by the application of borax. In these examples the soil pH was about 6. (A somewhat similar leaf-burn symptom may be found in plants growing on soils of too low a pH and for such soils liming is the remedy.)

Boron deficiency symptoms have been noted in celery and in cabbages and cauliflowers on the vegetable area on Rukuhia peat near the Soil Research Station.

Molybdenum

In 1945 in investigations of whiptail of cauliflowers large growth responses were obtained after molybdenum application, and at Papatoetoe it was shown that ammonium molybdate at 5lb. per acre corrected this disease. The present recommended rate is 1lb. of sodium molybdate per acre.

In 1950 trials were carried out at Hope, in the Waimea Plains, with a wide range of broccoli and three cauliflower varieties. Incidence of clear whiptail symptoms ranged in the controls from 9 to 80 per cent. in the different varieties, and from 0 to 28 per cent. in the plants treated in the seed-bed with 1oz. of ammonium molybdate to 10 sq. yds. In 6 varieties of broccoli supplied by the Crop Research Division of the Department of Scientific and Industrial Research the varieties maturing in May and July tended to show a higher incidence than did those maturing from August to October.

In 1950-51 in two experiments in the Oamaru district, each with three varieties of cauliflowers, good control of whiptail was also obtained by seed-bed treatment with 1/10oz. of sodium molybdate per square yard 3 weeks before transplanting into the field. Incidence of whiptail at harvest ranged from 5 to 12 per cent. in the untreated plants, and complete control was obtained in the treated plants.

In a survey of soils and plants from whiptail areas poor correlations were found between any of the three factors soil acidity (pH), available molybdenum, and available manganese on the incidence of whiptail, and plant analytical levels also showed poor correlations. The plant levels associated with symptoms appear to be higher than those found by research workers overseas, but it has been pointed out that a setback to growth can produce whiptail symptoms, and this may be a complicating factor in New Zealand.

Some responses to molybdenum were obtained in peas in an experiment at the Department of Agriculture Levin Horticultural Research Station in 1952. Foliar sprays gave no significant increase in total plant weight, but where the molybdenum was applied in the base fertiliser at just over 1lb. of sodium molybdate per acre there was a significant response in total weight. The 20 treated plots could be picked out by the darker foliage colour, but there was no significant increase in the yield of peas. A similar effect has been reported in Nelson.

In North Otago molybdenum responses were obtained in other market garden plants, including turnips, swedes, radishes, silver beet, carrots, and parsnips. There is a possibility of responses in some of these crops in other districts on soils associated with whiptail in cauliflowers and broccoli.

Boron deficiency symptoms. Above—Celery with cracked stem (left) compared with healthy celery (right). At right—Hollow stem of cauliflower.

Copper

In 1948 and 1949 large responses resulted from bluestone applications on onions on Marshland peat near Christchurch. Two 0.25 per cent. spray applications, each providing 20lb. of bluestone per acre, gave better yields than did 56lb. or even 200lb. of bluestone applied to the soil. There is some field evidence of copper responses in vegetables on newly developed Opiki peat soils.

In recent Soil Research Station experiments on Rukuhia peat marked responses have been obtained to application of 56lb. of bluestone per acre, applied 17 days after planting, in carrots and maize and smaller responses in cauliflowers and lettuces. In later work responses in other plants have been demonstrated. In the cauliflowers the weight of marketable heads was considerably increased by the copper applications. The maize plants on all treatments without copper showed yellow streaking of the foliage, very short stem internodes in the worst plants, and poor seed development. Sweet corn showed similar symptoms in the previous season.

Copper is an activator of several enzymes, and, as plant analytical levels were extremely low in these peat experiments, it is evident that the copper is here acting as a plant nutrient and not as a fungicide or soil sterilant.

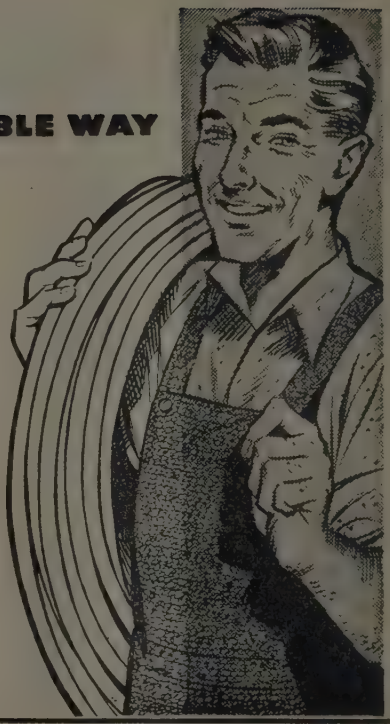
There is need for experimentation with copper on peats in other districts, including the market garden soils of Opiki and Raumati and other potential vegetable areas such as the Bay of Plenty peats.

There is no clear evidence of copper responses in vegetables on mineral soils used for market gardening, but the practice at Pukekohe has been to recommend the use of 30lb. of bluestone per acre for onion crops when these are **not** grown after potatoes, which, of course, are intensively sprayed with copper fungicides for the control of blight.

Magnesium

Low magnesium levels were found in various tissues from tomato plants showing interveinal chlorosis (yellowing between the veins) of the leaves in a Hutt Valley glasshouse. In 1952 it was demonstrated experimentally that this symptom could be prevented by spraying with a solution containing 2 per cent. of Epsom-salt. Magnesium deficiency symptoms have been noted

Farm Piping THE FLEXIBLE WAY



Take a coil of CONTOUR PIPE over your shoulder, a pocket knife and blow lamp and you are fully equipped to lay 500 feet or so of pipe line. Due to ease of laying installed cost is less than any other pipe—that's real flexibility.

CONTOUR PIPE is quickly and easily installed and can be adapted to pumps, troughs and any existing galvanised water or skim milk reticulation scheme. It's almost indestructible. It withstands frost and will not burst. It withstands corrosion by water or soil, skim milk, caustic and most acids. It comes in 50, 100, 200, 300 and 500 foot coils.

free !

illustrated brochure from your stock and station agent, dairy factory or store or direct from Neill, Cropper & Co. Ltd., Auckland, Wellington, Christchurch and Dunedin.

DON'T BUY ANOTHER FOOT OF PIPE until you have investigated . . .

CONTOUR PIPE

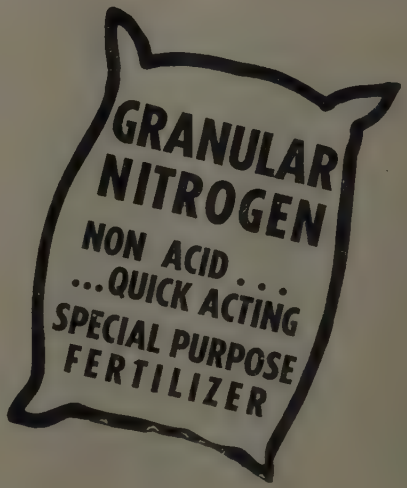
Sole Selling Agents for the Manufacturers Plastics Division N.Z. Glass Manufacturers, Co. Pty. Ltd. Neill, Cropper & Co. Ltd.

CP.23

ENSURE EARLY SPRING FEED

by TOPDRESSING with

"NITRO-PLUS"



Order stocks now from your Fertilizer Merchant

IMPERIAL CHEMICAL INDUSTRIES (N.Z.) LIMITED

P.O. Box 900, AUCKLAND. P.O. Box 1592, WELLINGTON. P.O. Box 1486, CHRISTCHURCH.

in glasshouse tomatoes in all the main tomato growing areas. Analyses have shown low magnesium levels in plant tissues in all such plants examined in spite of rather high levels of exchangeable magnesium (a measure of magnesium "available" to plants) in the soil in some cases. In these instances, however, exchangeable plus water-soluble potassium has been very high, and the magnesium deficiency appears to be potassium induced. High soluble salts, due to accumulation of unused fertilisers or fertiliser residues, may also accentuate this deficiency.

Apart from publications on glasshouse tomatoes, there is no published work on magnesium deficiency in market garden crops in New Zealand. The use of serpentine superphosphate during the war and "super. compound" until recently may have delayed the onset of magnesium deficiency in market gardens where heavy applications of superphosphate are normally used. Serpentine contains magnesium in a form which appears to be available to plants when the rock is finely ground.

In plant nutrition trials at Hamilton on Horotiu sandy loam there is analytical evidence of low magnesium levels in plant tissues and occasionally symptoms believed to be due to magnesium deficiency have been noted. However, no marked responses to magnesium applications have been obtained in vegetable crops over the past several years, even after the Epsom-salt applications were increased to 5cwt. per acre in 1952 and 10cwt. per acre in 1953. Carrots in 1952 and potatoes in 1953 showed small and barely significant responses. Spray applications may have to be used to check on the possibility that the magnesium applied to the soil is being rendered unavailable to the plants. Low levels of magnesium have been found in cabbages and cauliflowers forwarded for diagnostic purposes. Sometimes there has been evidence of interveinal chlorosis, but proof of magnesium deficiency is lacking. Experience is that interveinal chlorotic symptoms are often most ambiguous.

Manganese

There is analytical evidence of manganese deficiency in various vegetable and tomato crops. Among samples submitted for analysis 27 have shown low levels ranging from 5 to 26 parts per million, mostly on soils of pH above 6.5 and all above 6.2, except on two heavily limed sandy peats where the pH values were 5.9 and 6.2. Most of these low levels have been associated with interveinal chlorotic symptoms.

As the trouble appears to be associated with overliming or with too high pH, an acidifying programme has been advised as a practical solution, as in most soils manganese availability is strongly influenced by pH.

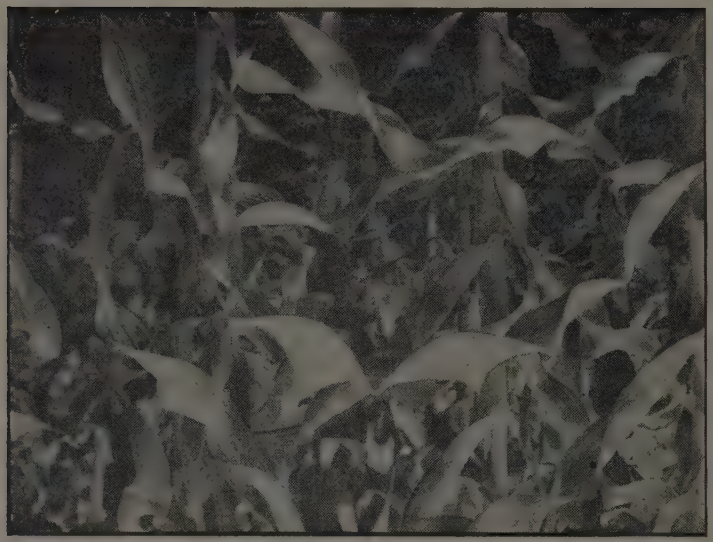
Poor crops on soils of high pH (above 6.5) have been reported, and here again manganese deficiency is a possible cause.

Whiptail of cauliflower.

Fine mottle in tomato foliage due to deficiencies of iron and manganese.

Manganese Toxicity

Manganese is unusual in that there is evidence of both deficiencies and toxicities in vegetables in New Zealand. Very high manganese levels have been found in foliage from tomato plants showing interveinal necrosis (death of tissues between the veins of the leaflets) and chlorosis rather like magnesium deficiency symptoms. Affected leaves contained 960 to 1700 p.p.m. of manganese in 5 cases, comparable healthy leaves from unaffected plants containing 220 to 730 p.p.m. Leaves from lettuces with



Yellow striping of the leaves of sweet corn and maize grown on copper deficient Rukuhia peat. Overseas this type of symptom has been noted with many different deficiencies.

stunted chlorotic growth and marginal and tip burn contained 4300 p.p.m. of manganese compared with 230 p.p.m. in unaffected plants. Seedling cabbages showing cupping and marginal chlorosis contained 5700 to 7300 p.p.m. of manganese. Most of the high manganese levels were associated with low soil pH and should be corrected by liming, but in 2 of the 5 instances with tomatoes and in the seedling cabbages the pH was 6 or higher.

At least 25 other instances of interveinal chlorosis or marginal leaf scorch associated with poor crops have been shown in the service work of the Soil Research Station to be associated with low soil pH's. Pumpkins, cucumbers, tomatoes, beans, lettuces, cauliflowers, silver beet, beetroot, peas, leeks, onions, strawberries, and rhubarb have been affected on soils of pH's ranging from 4.1 to 5.5, mostly below 5.2 Excellent results have been reported in many of these cases after liming to a pH of about 6. In a field trial with tomatoes at Mangere on a soil of pH 5 liming gave an average increase in yield of 50 per cent.

These acidity effects are not necessarily due to manganese toxicity, but may be due, among other causes, to toxicities of aluminium or iron or to an induced deficiency of molybdenum. Of course not all soils of pH's below 5.5 will respond to liming.

Iron

An interveinal fine chlorotic mottle and over-all yellowing of tip and axillary foliage of glasshouse tomatoes, believed to be due to iron deficiency, has been noted in several houses, especially in the Christchurch and Auckland areas. Of 10 instances examined 7 have been associated with soil pH's in excess of 6.

Sulphur

At Oamaru marked responses to sulphur-containing fertilisers have been demonstrated in various plants, including brassicas and beans. Some very low sulphur levels have been noted in analytical work on turnip samples from Oamaru and on turnip and swede samples from Gore.

In an experiment with different forms of nitrogen and phosphorus at the Soil Research Station rather low sulphur levels have been found in cabbage leaves and an experiment has been laid down to determine whether part of the superphosphate response on this area is due to the sulphate component of superphosphate.

The fertiliser mixtures used for market gardening usually contain fairly large amounts of superphosphate, and therefore sulphur deficiency is unlikely as long as sulphur-containing fertilisers are used. It is interesting to note that dried blood, blood and bone, and meat and bone samples analysed have contained 0.4 to 0.7 per cent. of sulphur, amounts sufficient to supply, in heavy dressings, a significant proportion of the plants' sulphur requirements.

Sodium

Vegetables of the family Chenopodiaceae, which includes the beets and true spinach, and also celery are said to respond to sodium-containing fertilisers when other plant nutrients are adequate. Crucifers appear to benefit to a less extent. The use of sodium salts requires investigation under New Zealand conditions.

Zinc

Zinc deficiency has not yet been recorded in vegetables in New Zealand, though in 1951 workers of the Soil Bureau of the Department of Scientific and Industrial Research found that the brassica mustard responded to zinc in pot experiments with Rangitoto sandy loam.

Trace Elements in Fertilisers

Trace element deficiencies may be less in market garden crops than in pastures and farm crops because of two main factors:—

First, in market gardens heavy dressings of fertilisers are used, applications of 1 ton of mixed fertilisers per acre being commonplace and heavier dressings sometimes being used. Trace elements naturally present in the fertiliser components will be added in much greater amounts than with pastures or fodder crops.

Second, organic fertilisers extensively used in market gardening must make a significant contribution. Chinese market gardeners still favour the use of blood and bone and many fertiliser mixtures contain this material, of which it has been said: ". . . it is difficult to explain the value of dried blood as a top dressing on the basis of nitrification alone. It may well be that part of its efficacy, which is not questioned here, is due to constituents other than nitrogen. Of these mention may be made of trace elements which it must contain" (1), and "The effectiveness of bonemeal is increased by its nitrogen content and also by its content of secondary and rarer essential elements" (2).

In addition to blood and bone other forms of organic matter are frequently used, for example, straw, rotted silage or hay, animal manures, offal, compost, sawdust, or peat. These materials may add significant amounts of some of the trace elements.

The grower who uses no organic supplements is the one most likely to encounter trace element deficiencies.

Acknowledgment

Acknowledgment is made to research and extension workers in the Department of Scientific and Industrial Research, the Department of Agriculture, and other institutions in New Zealand for much of the information contained in this article.

References

1. O. Owen, D. W. Rogers, and G. W. Winsor, "The Journal of Agricultural Science", Vol. 40, pp. 185-190, 1950.

2. G. H. Collings, "Commercial Fertilisers", 3rd edition, p. 166, 1941.

Catching and Holding Household Poultry for Inspection

THE aim of a householder should be to have his birds quiet, because when they are docile it is possible to catch many of the flock without the aid of a catching hook, net, or other type of device. Birds should always be handled with care, as any unnecessary frights increase the nervousness of a flock, which will affect their production. A serious fright is almost certain to bring on an unseasonal moult and stop production for several weeks. In this article H. H. Watson, Poultry Instructor, Department of Agriculture, Wellington, describes suitable devices for catching poultry and how birds should be handled for inspection.

A POULTRY keeper should inspect his birds at least once daily and a convenient time to do this is while the birds are feeding. During this period the movements of the birds can be carefully watched and any that appear "off colour" or lifeless should be caught and examined. The general handling of birds is an advantage, as the owner gets to know them individually and after a short period the birds can become very quiet. When a bird is being caught the main point is not to upset her or to scare other birds.

Catching Devices

The wanted bird should be separated from the others and persuaded to move toward one side of the fowl house or preferably toward a corner, where it may be caught quietly. Exceptionally quiet birds may be caught by hand, but normally it is necessary to use some device such as a catching hook or a net. Either of these can be made by any handyman and a hook or a net can then be left hanging in a fowl house for use when required. Experience is needed to use either a hook or net efficiently, but after a short period of practice the owner will become accustomed to a particular method of catching birds.

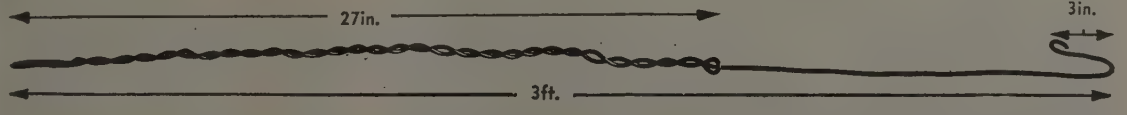
Hook

The hook is made from a piece of No. 8 gauge fencing wire and the over-all length is approximately 3ft. The wire is doubled and twisted tight for about 27in. of its length to give the hook strength. The single wire at one end is turned back 3in. to form a crook, so that there is no sharp edge to cut into the bird's leg, and the other end is turned into a loop.

The art in using a hook is to catch a bird as it is moving away. Endeavouring to hook a bird when it is running toward the catcher is almost impossible. The bird should be hooked by one leg above the foot so that the spread of the toes prevents the foot from slipping through the neck of the hook. After the bird has been hooked a steady strain is required to keep the leg outstretched. The bird should be pulled toward the catcher, who then bends down, releases the bird from the hook, and takes hold of her by both legs.

Net

Less practice is required to catch a bird with a net than is needed with a hook. The net provides the safest means of catching all birds, especially young birds, as it never causes broken



Above—Catching hook made from a length of No. 8 wire. Below left—Positioning the hook to catch a bird by one leg. Below right—When the shank is caught, enough pull must be exerted to stop the bird from kicking and thus releasing her leg.

Above—Using a catching net. A deep net prevents the bird from jumping out. Below—There is no need to pin the hen to the ground under the net, as a quick turn of the wrist permits the snared bird to be lifted up.

legs, which sometimes result when a hook is used.

The bag of the net should be 2ft. deep with the loop to hold a net 15in. in diameter. The loop is attached to a handle of up to 2½ft. long. A long handle is not necessary and the bag must be deep enough to enmesh the bird. Nets are usually made of cord or twine netting. Wire netting is not suitable because it is cumbersome and because after a short time the birds become very cunning owing to the conspicuousness of such a net and are on the alert to dodge it. To catch a bird which is standing the net is brought down over her. If she is running, the open net is thrust just ahead of her so that her momentum carries her into it before she can change direction. A turn of the wrist enmeshes the bird and enables the net to be lifted.

The catcher should not wave the hook or the net round in the air, as movements such as these among a pen of birds will upset them. A wanted bird should be edged away from the flock before any attempt is made to catch her. After only a little experience the catcher can net the bird whether it is stationary, on the ground, on the perches, running, or flying.

Hinged Frame

When a large number of birds has to be handled the use of a movable hinged frame placed in a corner is a help. The birds can be driven into the frame, caught, and handled.

Holding Birds

Regardless of the device used for catching it a bird will usually endeavour to try to escape. Once it has been caught a bird should be gripped quickly and prevented from struggling. Holding a bird by its legs or wings for short periods does not harm it, as hens are very powerful in these limbs. However, when a bird is being held for examination it should be transferred to one hand so that the keel or breast bone and the weight of the bird's body rest on the palm. The bird's legs can be gripped firmly by placing two or three fingers between the legs. The front of the bird should rest along the forearm. In this position a bird can be held or carried with little discomfort to the bird or the owner.

Talking to hens will encourage confidence in the birds and before long they will permit themselves to be picked up in the fowl house without attempting to run away. Movements which otherwise would scare them will not even cause a flutter if they are first warned by a voice to be on the alert. Many poultry keepers make a practice of whistling or singing before entering the fowl house. The birds soon get to know that someone is approaching and so are not frightened suddenly when anyone is passing or entering the house. Good producers are birds which are well cared for and contented.

All photographs by Niederer.

Vacuum Plant for Removing Excess Water from Honey

IF excessively wet weather is experienced during the main honey flow, the honey is often found to contain an excess amount of water. In this article two officers of the Department of Agriculture, C. R. Paterson, Apiculturist, Hamilton, and T. Palmer-Jones, Research Officer, Animal Research Station, Wallaceville, describe a plant capable of removing such excess water from the honey.

USUALLY the sugar concentration of honey is sufficiently high to prevent yeast growth. However, if the water content of the honey rises above a certain point, the sugar concentration is so reduced that yeast growth and fermentation are liable to occur. In practice it has been found that for safe keeping over long periods honey should contain no more than 17.2 per cent. of water.

Though the beekeeper may take every precaution during extraction and processing to prevent the entry of moisture into the honey, he cannot readily alter the condition of the honey before extraction. Experimental work has shown that even fully capped honey while still in the hive can contain excess moisture.

In certain areas of New Zealand where the relative humidity is frequently high bees find it very difficult to evaporate off as much moisture as usual from the honey during the ripening process and such honey when extracted often contains more than 17.2 per cent. of water.

It can therefore be expected that during periods of wet weather in these areas quantities of honey may be extracted which contain too much water. One season the quantity of honey with excess water was estimated to be approximately 200 tons. Honey in this condition has a very much reduced market value and means considerable loss to the beekeeper. Experimental work was therefore begun to see if some satisfactory method could be devised of removing this excess water from honey. After much preliminary work in the use of hot air efforts were finally concentrated on a vacuum process.

Laboratory experiments were first carried out to determine the temperature at which honey boiled when both the vacuum to which it was exposed and its water content varied. The following table gives the effect of vacuum on the boiling point of honey.

Water in honey per cent.	Vacuum (Inches mercury) 25.5	26.5	27.5
	Boiling points in degrees F.		
16	160	151	134
21	154	143	130.5
Water alone ..	130	120	107

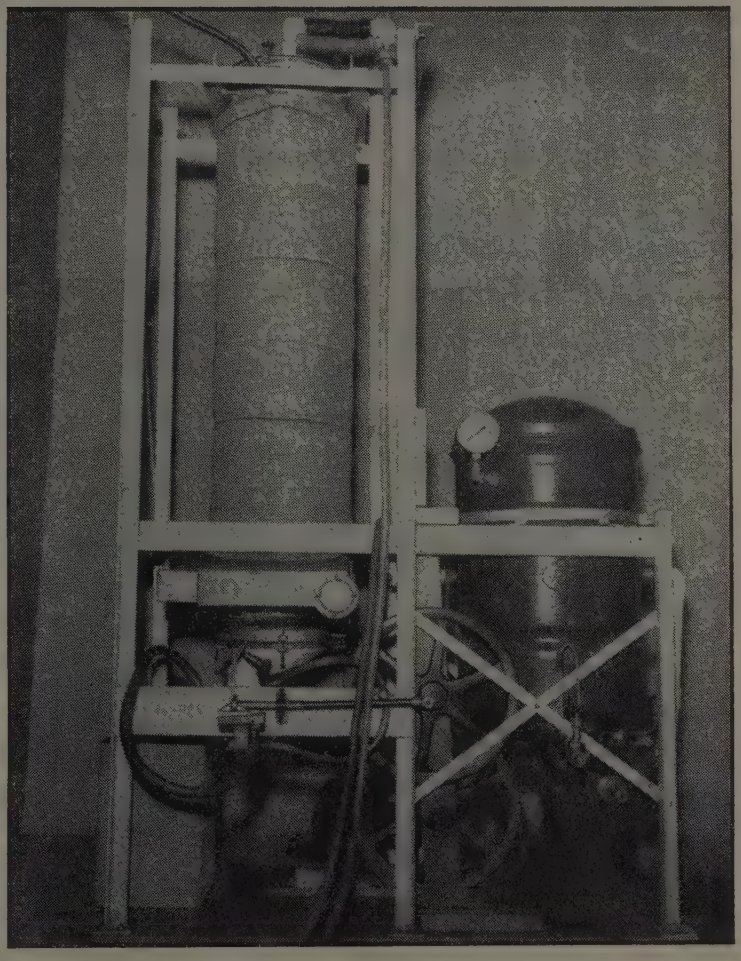
The above results showed that honey would boil at 134 degrees F. and give up moisture in a vacuum of 27.5in., whereas water boiled at 107 degrees. They also indicated that when the higher vacuum was used the honey boiled at a temperature that was not harmful. A plant was therefore designed and constructed to make use of the highest possible vacuum, standard milking machine parts which were readily available being used. It was considered that such a machine would need to be:—

Capable of removing approximately 2 to 3 per cent. of moisture from honey so as to bring it down to the safe amount of 17.2 per cent.

Capable of handling between 1 to 2 tons of honey per day.

Sufficiently simple in construction for the average person to operate.

Reasonably priced, because a plant of this type might run for a few days only each year.



A general view of the vacuum plant.

Essential Parts of Plant

A study of the diagrams of the vacuum plant will show that it is composed of four main parts:—

1. A vacuum tank with a motor to drive the vacuum pump.

2. A condenser; this is used to condense the hot water vapour as it is drawn off from the vacuum cylinder. The condensed water is collected in the lower portion of the vacuum tank. The condenser must always operate at maximum efficiency, that is, it is essential to make sure that ample cold

CANNING EXPERT
28, specialised in the manufacture of
jam and fruit preserves
wants labour contract for New Zealand.
Please write: B. Thomson, Braunschweig, Neue Str. 9 (Western Germany).

When it RAINS..

it DRAINS!

BROWN BROS.

CELLAR DRAINER

Damage to merchandise and property can be really serious during heavy rains, if flood waters find their way into cellars, basements, or any area in your building below street level.

Brown Bros. Cellar Drainer pump automatically operates when water rises in the pump, and switches off when all water seepage has been removed. Thousands of pounds worth of damage can be saved by the simple installation of this "flood-water watch-dog".

Ideal for Drainage, Elevator and Weighbridge Pits, Effluent from Septic Tanks, Sub-soil Drainage and draining Brewery Vats.

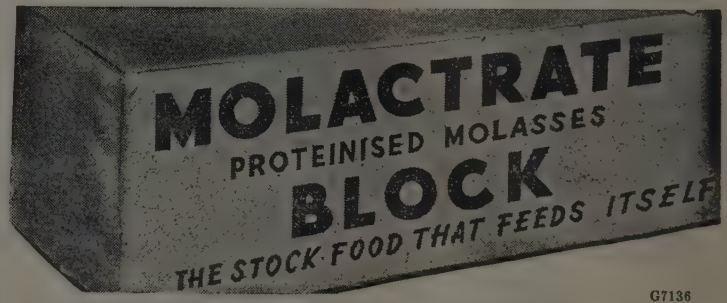
Write now for fullest details—

Brown Bros. ENGINEERS LTD

Pumping Machinery Specialists since 1908
590 Colombo St., P.O. Box 548J, CHRISTCHURCH
Telephone 65-195 (3 lines)

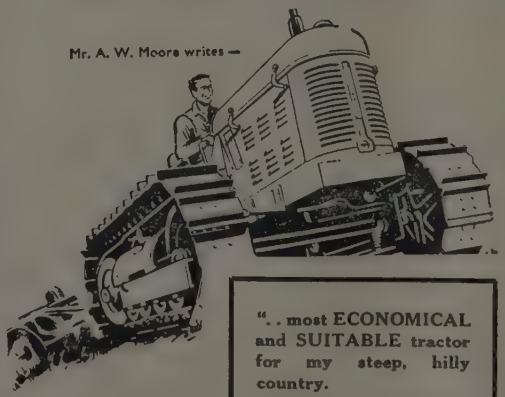
For only
1/6
per month
you can feed a 2oz. daily ration of

this highly concentrated food. It contains absolutely no fibre—that is why such a little is necessary to balance up your rough fodder with the essential food elements which are lacking at this season of the year. Keep your hoggets growing through the winter with a daily ration (1½ozs. will work wonders).



G7136

Mr. A. W. Moore writes —



"... most ECONOMICAL and SUITABLE tractor for my steep, hilly country.

"The power is surprising... fuel consumption very low (usually around 1½ gals. per hour on heavy work)... power turning another good feature."

Original on file.

Discuss the remarkable David Brown Crawler with your dealer or send to TODD BROS. LTD., Box 2295, Wellington, for a catalogue.

Petrol and diesel engines
WORLD'S FINEST TRACTORS

DAVID BROWN CRAWLERS from

£1299

f.o.r. main ports

COMPLETE *with 6-speed gearbox and 12-speed range, 4-speed PTO, choice of track widths, controlled differential power steering, electric starter, replaceable cylinder liners, force feed lubrication.*

WHEEL MODEL 25

£599

delivered any dealer town COMPLETE *with pneumatic tyres, hydraulic lift, self starter, 12-speed range of gearing, adjustable front and rear tracks, independent foot brakes and parking brake.*

DAVID BROWN

N.Z. Distributors: TODD BROS. LTD., Wellington
Dealers Everywhere

water is being circulated; otherwise the hot water vapour would soon put the vacuum pump out of action.

3. A vacuum cylinder, a steam or water jacketed container in which the excess water is removed from the honey as it passes down the inside walls. A cap at the top distributes the honey on to the sides of the cylinder.

4. A releaser and pulsator. Some means had to be used to withdraw the honey from the vacuum while the vacuum in the cylinder was still maintained. This is done by the releaser parts (A and B in the upper left diagram on page 574) and the pulsator, which creates an intermittent vacuum in compartment B.

The plant therefore consists essentially of a steam or water jacketed vacuum cylinder connected through a condenser to a vacuum tank and pump. The honey is pumped into the top of the vacuum cylinder and during its flow down the inside wall excess water is removed. Finally it is delivered through a releaser unit which is operated by a pulsator.

Description of Parts

The Vacuum Tank

The tank used was 25in. long with a diameter of 18in. The domed top was removable, but this is not necessary, and the possibility of air leaks would be eliminated if the whole unit was sealed. A control valve is set at the lowest part of the tank to drain off the condensed water. A water gauge can be incorporated in the unit to indicate the volume of water collecting. Though this is not essential to the running of the plant, it does give the attendant a definite record of how much water is being taken off. There should be sufficient capacity in the tank below the vacuum lead to hold approximately 5 gallons of water. This should be ample for say a 4-hour run.

A standard vacuum gauge is fixed to the tank.

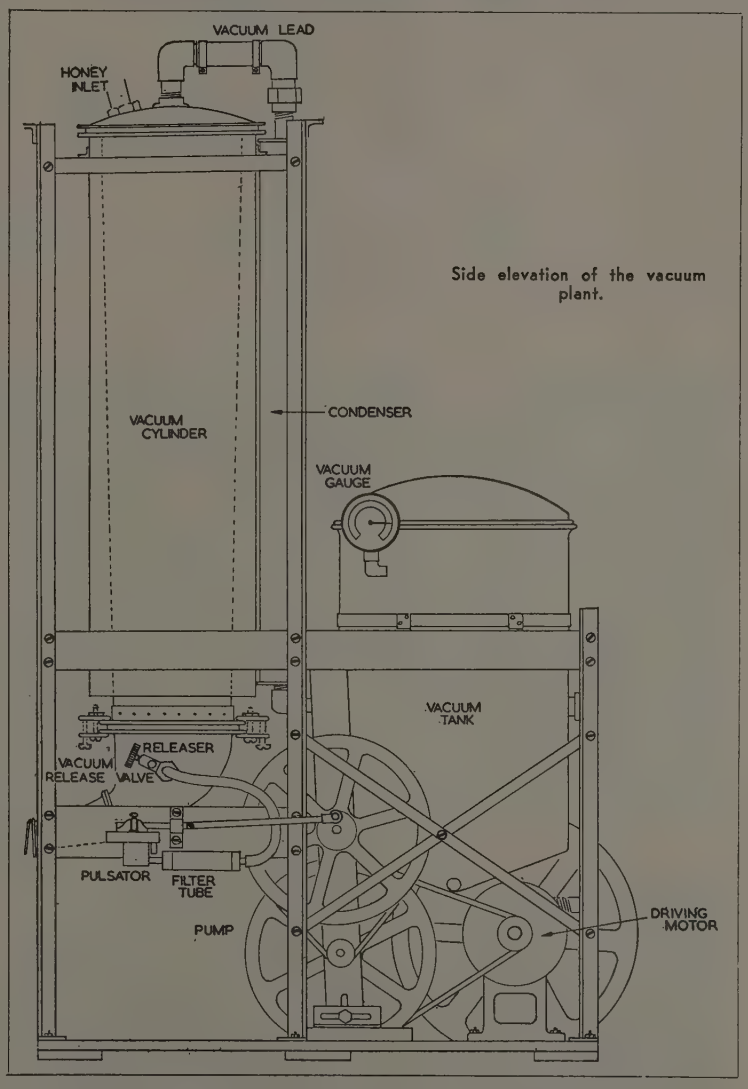
The Vacuum Pump

As a high vacuum (26in. to 27in.) has to be maintained for the successful operation of the plant, it has been found that a large pump is necessary. A standard "Masport" pump, run at 188 revolutions per minute, gives satisfactory results provided it is in new condition. The pump has a shaft extending out on both sides which allows for the driving motor on one side and the drive for the pulsator on the other. The speed of the pump was attained by having a 3in. driving pulley on a 1 h.p. electric motor and a driven pulley of 20in. on the pump. As the maximum recommended speed of these pumps is 300 r.p.m., the 188 r.p.m. operating speed could be increased if necessary. If this were done, the size of the pulley driving the pulsator would have to be reduced to keep the pulsation rate near to 7 a minute.

The Condenser

The outer casing of the condenser is 3ft. 8in. long with a diameter of 4in. The casing should be of copper, and a piece of down pipe could be used. Inside are three 3ft. 4in. lengths of ⅜in. copper tubes brazed into end plates. These are soldered into the outer casing so that a good watertight joint is ensured. Brass plates at top and bottom provide suitable metal to screw in pipes for the vacuum leads. These also require to be well soldered. Water connections are made in the outer casing at top and bottom to allow water to circulate around the 3 copper tubes.

Overheating of the vacuum pump will occur if water vapour drawn from the vacuum cylinder is not completely condensed. The rate at which cooling water enters the condenser should if possible be regulated so that it leaves at a temperature not exceeding 70 degrees F. when the plant is running.



Side elevation of the vacuum plant.

The Vacuum Cylinder

The vacuum cylinder consists of an inner tube of 18-gauge stainless steel 4ft. 6in. long and slightly tapered. The top diameter is 11in. and the bottom diameter is 9in. The taper was considered necessary to keep the honey in close contact with the heated walls of the cylinder. Both ends have substantial flanges, the cylinder cap being secured to the top one and the releaser to the bottom one.

A copper cylinder of approximately 12½in. diameter which acts as the heating compartment is attached to the stainless steel cylinder. Steam is admitted at the top and the outlet is at the bottom. No steam pressure should be allowed to build up in this compartment. If hot water is used

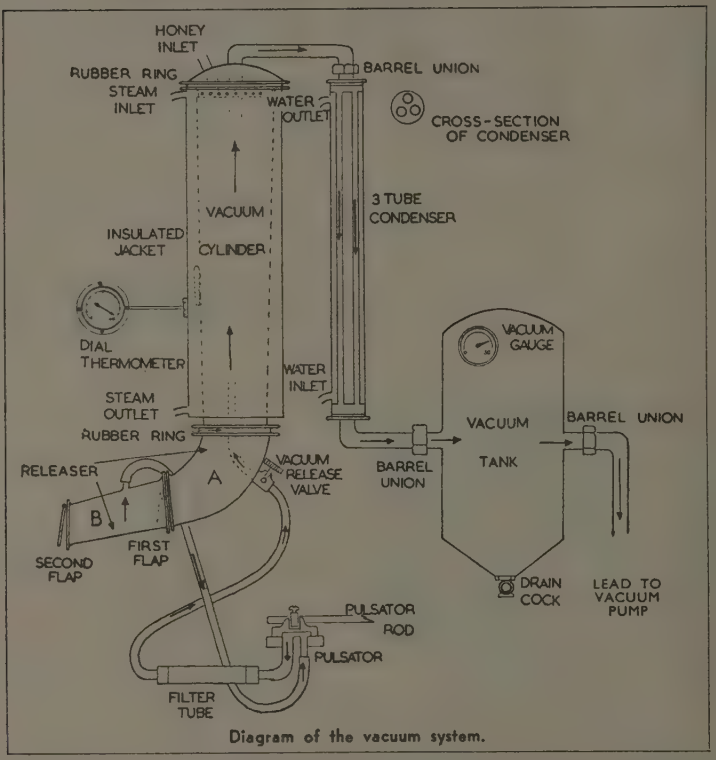
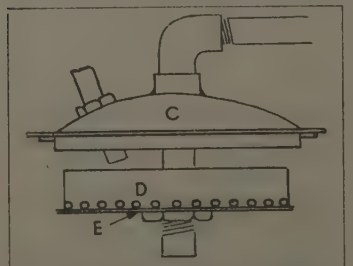


Diagram of the vacuum system.

for heating, it should circulate from a boiler which is capable of maintaining the temperature at boiling point. It was found during experimental work that electric elements were not suitable for maintaining the high temperature required.

A dial thermometer is placed in the steam jacket to measure the temperature, which should be kept at 212 degrees F. The temperature is regulated by adjusting a valve controlling the steam supply.

The domed cap or top of the vacuum cylinder, which must be detachable, is made of stainless steel, with a flange corresponding to that on the cylinder top. About 1in. of the dome protrudes through the flange to keep the rubber sealing ring in place and to act as a register in placing it in position. In the centre of the cap is the vacuum pipe, a 1¼in. water pipe which passes right through the honey distributing plate. This is a circular disc with a diameter approximately 1/32in. less than that of the cylinder at the point of suspension. The plate is adjusted into position by two lock nuts on the vacuum pipe. As it is desirable for the honey to run down the inside of the cylinder in an even stream, a metal strip 2in. wide was soldered round the top circumference of the distributing plate. Small holes were bored around the circumference of this strip just where it is soldered to the plate. The holes are of such a size that they cause the honey to build up inside to about 1½in., so giving sufficient head to shoot the honey evenly out of the holes on to the sides of the cylinder.



The cylinder top (C), honey distributor (D), and distributing plate (E).

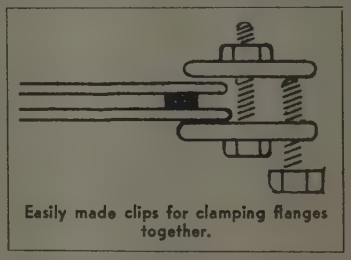
The depth required for this strip and the size of holes required will have to be determined by trials with strips of different depth and with different sized holes. The honey should be pumped in and adjustments made until the head of honey remains at a constant level of about 1½in. The rate of flow for the size of plant described was about 9lb. to 10lb. per minute.

The honey inlet to the cap is off centre and placed so that the honey will drop into the distributing compartment.

This cap and the vacuum lead to the condenser should be insulated to prevent premature condensation of water vapour.

The Releaser Unit

Removal of the honey from the vacuum cylinder is effected by means of a standard milking machine releaser unit, the upper portion (A in the upper left diagram on page 574 having a flange to correspond with that on the lower portion of the vacuum cylinder. This is fixed into position with metal clips and a rubber ring. A narrow rubber ring fits into a groove on the lower end of A, where a metal flap, pivoted to open outward, is attached. The spit chamber B has a similar arrangement. These flaps should be made of light metal and suspended so that they hang loosely against the rubber rings. A tube near the top of the spit chamber leads to a vacuum source through the pulsator. The spit chamber is securely fixed to A by means of a rubber ring and flange nuts. The releaser cannot operate unless an intermittent vacuum is created in the spit chamber. A milking machine pulsator is used for this purpose.



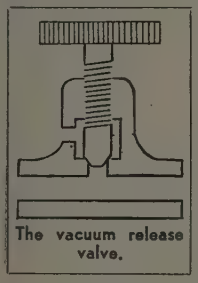
Easily made clips for clamping flanges together.

The Pulsator

The pulsator is essentially a sliding valve which subjects the spit chamber to vacuum and normal air pressure alternately. For honey the rate of pulsation should be 5 to 7 per minute.

The pulsator is constructed in such a way that the main port A is connected to the vacuum line and the smaller port B leads to the releaser. When the slide valve covers both ports air is exhausted from the spit chamber, so allowing honey in the vacuum cylinder to come past the first flap but not past the second one, because the compartment closed by this is under vacuum. The valve in the pulsator then moves so that the small port is uncovered, thus admitting air to the spit chamber where it immediately causes the first flap to close. The weight of honey in the spit chamber is now capable of opening the second flap, thus finally releasing the honey from the vacuum system. The pulsator must be adjusted to allow only a certain amount of honey to be drawn into the lower chamber each time; if too much enters, it will be sucked up into the pulsator. The vacuum lead to the

pulsator is taken from a fitting at the lower end of the vacuum cylinder. The reason for making the connection here is to allow the air which is taken from the spit chamber at each pulsation to flow up the centre of the vacuum cylinder; it will mix with the water vapour coming off the honey and leave at the top to enter the condenser. A release valve, fitted into the lead from pulsator to vacuum unit, is used for breaking the vacuum before the vacuum pump is shut off or for controlling the vacuum at a lower reading.



The vacuum release valve.

Power Drive for Pulsator

In milking machines the pulsation rate is 30 to 40 per minute. As honey is very much more viscous than milk, greater time has to be given for the honey to move from one compartment to another. A rate of 5 to 7 per minute appears to be correct. A train of pulleys had to be used to obtain this speed when the drive was taken from the shaft of the vacuum pump. These were built up into a unit so that belts could be easily adjusted. The pulleys were mounted on a steel arm, pivoted at the top and free to move along a slot for a couple of inches, thus allowing the belt from the pump to be adjusted. The two large pulleys have their short shafts running in a long brass bearing. The bottom one is fitted in slots which permit adjustment of the belt between the large and small pulley.

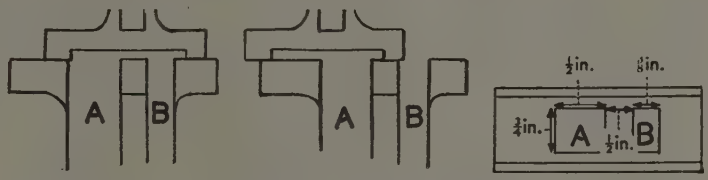
The various pulley sizes are as follows:—

Pulley on pump shaft, 3in.
Pulley to countershaft, 15in.
Pulley on countershaft, 2in.
Pulley to pulsator drive, 15in.

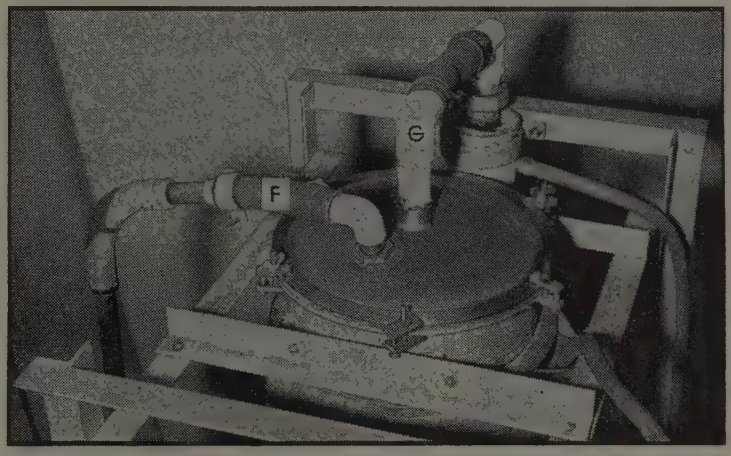
The crank driving the pulsator rod is offset ⅜in., thus giving a stroke of 1½in.

Supply of Honey to Cylinder

Honey can be supplied to the vacuum cylinder by either gravity or pump. During the experimental work it was found that taking the honey from floor level by vacuum was not very satisfactory, as it appeared to overload the vacuum pump. It was also found most difficult to control the flow at an even rate by this method. Delivery by a pump unit, once the flow rate was determined, gave the most satisfactory results. The method of determining the flow rate is to pump honey at the working temperature and note how long it takes to fill say a 60lb. tin. The flow can then be adjusted by increasing or decreasing the size of pulley on either the motor or countershaft, whichever is most suitable. If the honey is going to be run through at a temperature of approximately 80 degrees F., a slower



The pulsator. Left—In this position the pulsator allows the vacuum to draw air from B (see diagram on opposite page). This causes the second flap to close and the first flap then opens with the weight of honey built up in compartment A. Middle—In this position the pulsator allows air into B, causing the first flap to close, and the second flap then opens with the weight of honey previously released from A. Right—Ports in the face of the pulsator.



The cap for the vacuum cylinder, showing the honey inlet (F) and the vacuum lead (G) to the condenser.

The releaser (H), the pulsator (I), and the vacuum release valve (J).

DIGS POST HOLES
at the rate of
2 FEET PER MINUTE!

INDISPENSABLE TO ALL FARMERS & GROWERS

Speed up hole digging and save energy as well as time. When erecting fences, planting trees and in building operations you'll find the Jarrett pays for itself the first few times you use it.

Available in 4", 6", 8" and 10" sizes.

Stocks on hand — order now.

£2 - 11 - 0

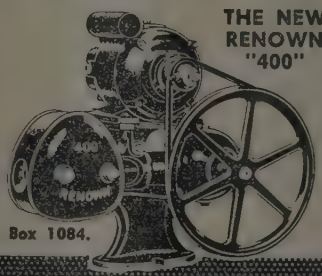
IRRESPECTIVE OF SIZE

JARRETT
POST HOLE DIGGER

PREMIER PRODUCTS LTD.
BOX 1667, WELLINGTON

Proved... in more than 30,000 N.Z. Homes and farms

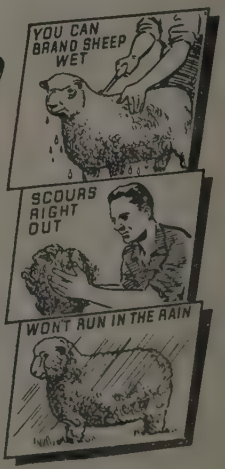
Renown water systems represent the accumulated designing, manufacturing and installation experience of more than 75 years of pump specialisation. No matter where your water is or how you want it delivered — there's a Renown Pump to do the job better and probably at less cost too.



W. H. PRICE & SON Ltd.
34-36 Manchester St., Ch'Ch. P.O. Box 1084.

RENOWN
WATER SYSTEMS

You can even Brand them WET!



Yet another Elliott triumph. FIRST with practical liquid phenothiazine — FIRST with easy oesophageal drenching — And NOW Elliotts Branding Fluid gives you ALL these special features:—

- WILL NOT RUN IN THE RAIN (YOU CAN EVEN BRAND SHEEP WET)
- SCOURS RIGHT OUT
- COMPLETELY LEGIBLE
- REMAINS CLEAR AND SHARP
- ENSURES TOP WOOL PRICES

Elliotts BRANDING FLUID

FROM YOUR USUAL STOCK and STATION AGENT

Marketed by Elliotts N.Z. Company, ELLCO LTD., Onehunga, Auckland.

rate should be decided on so that the heated cylinder will have time to bring the temperature of the honey up to the point where moisture can be extracted from the honey.

The abbreviated table at left below gives some of the results obtained during the experimental runs with the plant.

Method of Operation

Before a run is begun all vacuum joints are checked for tightness. A good method when assembling such a plant is to start at the vacuum tank, run the vacuum pump, and place a rubber cork over the lead to the condenser. Note the reading on the vacuum gauge. If it reads 27in. to 28in., it can be assumed that all is right with this component. Now connect up the condenser and carry out the same procedure. If the reading is still high, carry on and connect up the vacuum cylinder. Work the plant first without the pulsator running and then with it functioning. By this means it is possible to decide approximately where the trouble is should a leak develop.

The flaps in the releaser are inspected to see that they are perfectly free. The water supply to the condenser is turned on. The steam valve is slowly opened to warm up the vacuum cylinder until the temperature gauge reads 212 degrees F. The vacuum pump is now started and as soon as the gauges reach 27in. the honey pump is switched on. As honey begins to flow down the inside of the cylinder more steam will be needed to maintain the required temperature. In a short time honey should begin to leave the releaser. The treated honey can then be run into suitable tanks either by gravitation or by an automatically controlled honey pump.

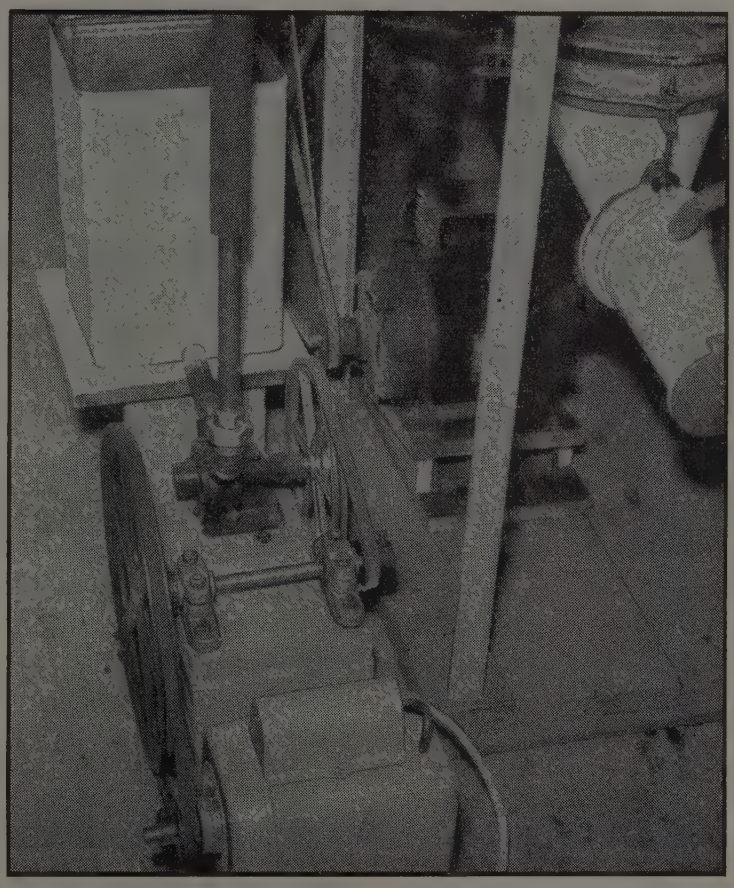
In stopping, the procedure given here should be followed:—

1. Switch off the honey pump.

2. Open the release valve to break the vacuum.

3. As soon as the vacuum gauge has returned to near zero switch off the vacuum pump.

4. Unless the plant will be used again immediately, take off the spit chamber of the releaser and clean the flaps in warm water. If honey is allowed to cool here, it will set quite hard and be very difficult to remove. This is the reason why the vacuum should be broken as soon as possible.



The pump unit connected to a 60lb. tin for delivering honey to the vacuum cylinder.

5. The condensate in the vacuum tank should be drained off and the quantity noted, as its volume will give a rough indication of how efficiently the plant has run.

Running Costs

The main cost in running the plant will be that of steam supplied. In experiments measurement of the condensate from the heating jacket indicated that approximately 60lb. of steam per hour would be required. A small boiler capable of converting into steam 60lb. to 70lb. of water per hour would meet the heat requirements in a plant of this size. The steam pressure necessary would be 2lb. to 5lb. per sq. in.

RESULTS OBTAINED DURING EXPERIMENTAL RUNS WITH PLANT

Type of honey	Clover	Clover	Kamahi	Buttercup
Temperature of honey entering plant (degrees F.)	80	105	127	104
Temperature of honey leaving plant (degrees F.)	125	126	138	133
Vacuum (in inches of mercury)	27.5–28	27.5	27.25	27
Percentage of water to start	18.3	18.2	19	19.9
Percentage of water at end	16.3	16.8	16.3	16
Percentage of water removed	2.0	1.4	2.7	3.9
Volume run (gallons)	3.5	3.5	4.0	4.0
Time of run (minutes)	12.0	5.0	5.7	13.0
Gallons per minute	0.3	0.7	0.7	0.325
Gallons per hour reduced 2 per cent.	18	29	57	38

Note: 1 gallon of honey with specific gravity of 1.420 weighs 14.2lb.

Cost of Plant

For those who may contemplate erecting a plant the following list gives the cost of the various items used in the plant described in the article.

	£	s.	d.
Standard vacuum pump	21	2	6
1 h.p. electric motor	23	10	0
Vacuum tank (second hand)	7	10	0
Releaser (second hand)	3	0	0
Pulsator (second hand)	1	5	0
Vacuum gauge (second hand)		15	0
Iron work for frames, etc.	4	12	6
Wood base	1	0	2
Material for condenser	5	0	0
Vacuum cylinder (stainless steel with cap and copper outer jacket)	62	15	2
Pulleys and belts, etc.	9	15	0
Pipe fittings	3	10	0
Sundries	6	4	8
	150	0	0

The cost of pumping units and a steam boiler would be extra. The above figures are for material only and do not include the cost of assembly.

Results

Trial runs of the plant proved that it was capable of removing 2 per cent. of water from 2.5 tons of honey in 8 hours. As extracted honey seldom contains more than 20 per cent. of water, it would appear that on the average a 2 per cent. reduction would be ample to deal with most lines of honey. If the water content exceeds this amount, the condenser cannot deal with the volume of water leaving the honey and the vacuum pump will overheat and lose efficiency. Such honey should be run through the plant at a much slower speed than usual or the cooling surface of the condenser considerably increased.

If the plant is operated as usual when the water content of the honey entering it is only slightly above 17.2 per cent., the honey will be dried too much and its high viscosity will prevent the releaser flaps functioning properly. Such excessive drying can be prevented by running the plant at a slightly lower vacuum, say 25in. The lower vacuum is obtained by adjusting the releaser valve. The closer the temperature of the honey entering the plant is to the temperature at which boiling occurs, under the particular vacuum being applied, the more efficiently will water be removed.

The pulsation rate of 5 to 7 per minute is directly related to the rate of flow of honey through the plant. If the flow is increased, the pulsation rate also must be correspondingly increased; otherwise the spit chamber will flood and honey will be drawn through the pulsator.

Though such a plant is more likely to be of use in a central packing depot, there is no reason why a smaller set-up could not be used successfully by those beekeepers who occasionally get quantities of honey with an excess water content. Already one beekeeper has made his own plant, and during experimental runs it was found to work most efficiently.

Further information on the vacuum plant can be obtained from the authors or any Apiary Instructor of the Department of Agriculture.

Capacity of Plant

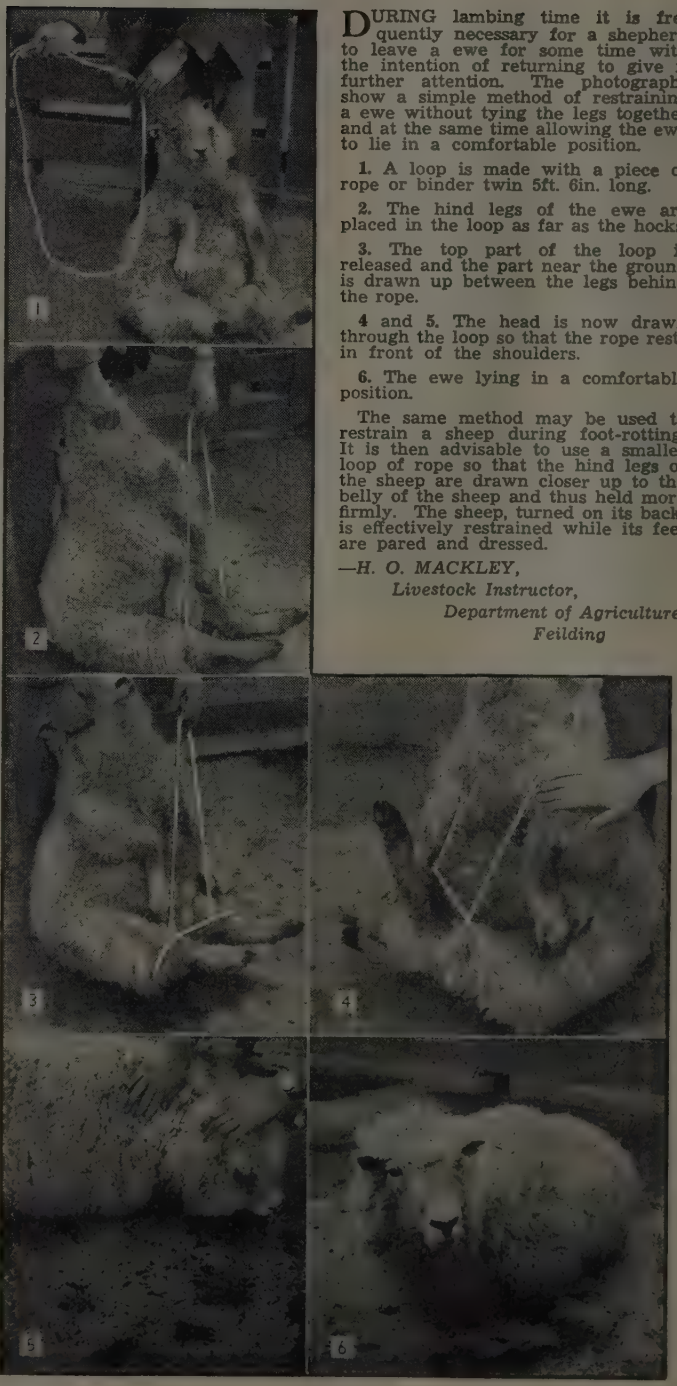
This equipment has shown that a continuous process for the removal of excess water from honey by vacuum process is available.

It is capable of removing the excess water without damage to the colour or flavour of the honey.

The cost of the plant is not excessive if use is made of standard milking machine equipment, much of which can be procured second hand and still in reasonable condition.

The experimental work in the development of the plant has already been described in the "New Zealand Journal of Science and Technology", Section A, Vol. 36, No. 4, p. 386, December 1954.

Restraint of Ewe in Paddock



DURING lambing time it is frequently necessary for a shepherd to leave a ewe for some time with the intention of returning to give it further attention. The photographs show a simple method of restraining a ewe without tying the legs together and at the same time allowing the ewe to lie in a comfortable position.

1. A loop is made with a piece of rope or binder twin 5ft. 6in. long.

2. The hind legs of the ewe are placed in the loop as far as the hocks.

3. The top part of the loop is released and the part near the ground is drawn up between the legs behind the rope.

4 and 5. The head is now drawn through the loop so that the rope rests in front of the shoulders.

6. The ewe lying in a comfortable position.

The same method may be used to restrain a sheep during foot-rotting. It is then advisable to use a smaller loop of rope so that the hind legs of the sheep are drawn closer up to the belly of the sheep and thus held more firmly. The sheep, turned on its back, is effectively restrained while its feet are pared and dressed.

—H. O. MACKLEY,
Livestock Instructor,
Department of Agriculture,
Feilding

Shelter for Auckland Home Gardens and Orchards

By H. A. PREW, Horticultural Instructor, Department of Agriculture, Tauranga

ALL parts of New Zealand are subject to winds of varying strengths, and though the climate of Auckland is relatively mild, protection against wind is an important factor in the growing of fruit trees and crops in that district. Though it is well known that fruit trees and most vegetable crops need protection, the fact that many ornamental trees, shrubs, and plants are also susceptible to wind is given less consideration.

FENCES and walls of various materials are able to give shelter, but for farm and home gardens living trees and hedges are very much more attractive. Advantage may be taken of topographical features, but they are seldom sufficient.

Planning for Shelter

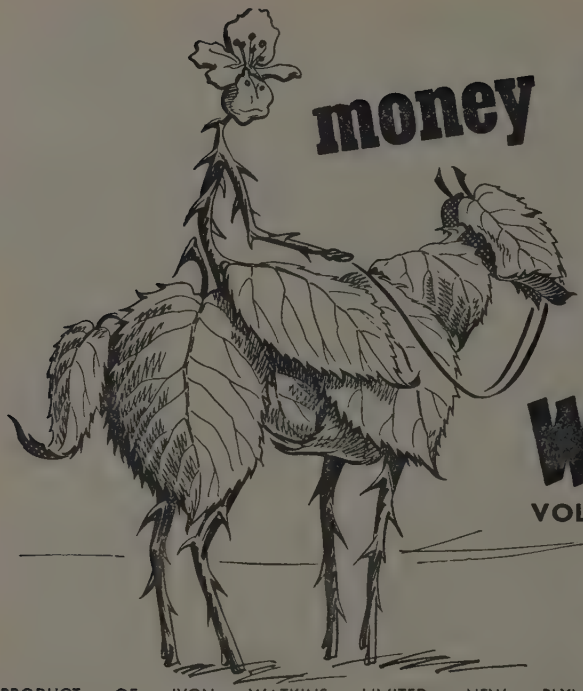
The first purpose of home garden shelter trees and hedges is to give protection for the home and its immediate surroundings, including fruit trees, vegetables, and less hardy ornamental plants. The second is to contribute toward an attractive setting for the home. Farm and large home sections allow far more scope than do the majority of small city allotments, but the possibilities of imaginative use of shelter even on the latter should not be overlooked.

Shelter in Auckland district must be designed to break the cool or cold west and south winds which, though not often very strong, persist for long periods in spring and autumn. These are the winds that make life for tender plants very difficult; they may cause stunting, uneven development, and unfruitfulness. Winds from other directions are less persistent and usually warmer; consequently they are of less importance except when they are stormy and blustering. Some protection from east and north winds may be necessary to prevent physical damage to trees and plants, but it should be kept to a minimum to avoid the equally ill effects of excessive shading. Winds from seaward may carry salt and therefore shelter plants must be used which are resistant or semi-resistant to salt injury. Some native trees and shrubs are very tolerant of salt-laden winds and are useful in such circumstances.

The kinds and sizes of trees to use will depend, within the limits of space available, on the direction of the slope of the land as well as on the direction from which the more persistent winds are expected. If it is practicable, the protective trees or hedges should also be designed to form part of the general garden plan. Evergreens provide the best all-year-round shelter, but where shading is a factor, especially if tall shelter is necessary, deciduous plants have the advantage of letting more

HEADING PHOTOGRAPH: An excellent formal hedge of red escallonia, showing what can be achieved with this variety.

money rustler!



If BLACKBERRY has been running wild on *your* farm, roping in *your* profits, it's high time you shot it dead with Hi-Vol Spray equipment and

WEEDONE SPECIAL 2, 4, 5-T

VOLATILE AND NON VOLATILE

Genuine Weedone products are recognised by this sign — make sure you get what you ask for

PRODUCT OF IVON WATKINS LIMITED, NEW PLYMOUTH — HOME OF THE WEEDONE SERVICE

IW.118

SINCE GRANDPA'S DAY — WE'VE COME A LONG WAY

New Zealand farm produce now faces much keener competition in the overseas market. Everything possible should be done to avoid waste and to streamline production. And overseas currency should not be unnecessarily frittered away.

As the Tractor has displaced the horse, so Bates Multiwall Paper Bags are replacing the old-fashioned method of bagging fertilizer. And Bates Multiwall Paper Bags save foreign currency because they are produced, from pine to package, with New Zealand material and labour.

PROGRESSIVE FARMERS NOW ORDER FERTILIZER IN

Bates Multiwall Paper Bags are immensely strong and dust free.

Fertilizer is kept in perfect condition, free from lumps. Contents cannot sift out. No waste through clinging inside the bag.

Easier to carry, stack and store.

Quicker and cleaner to empty.

BATES MULTIWALL PAPER BAGS

For further particulars, apply to the Manufacturers:—

N.Z. FOREST PRODUCTS LTD. MULTIWALL BAG DIVISION, PRIVATE BAG, AUCKLAND

sunlight through in the cold winter months.

Home garden shelter is also home shelter. Consequently it is essential that the relationship of fully grown hedges and trees to the house should be considered. Anxiety to protect the garden can lead to ill-chosen trees and hedges causing shading and damp conditions around the house. Whatever the problems are, protection must be given to enable less hardy subjects to thrive. Therefore, on a new section shelter should be planted first, should be hardy in the locality, and should be of a type which will break the force of prevailing winds.

In the warmer parts of Auckland district the very quick-growing *Albizzia lophantha* may be used as temporary shelter or, if space is available, to hasten the growth of permanent shelter by giving it protection from wind. This species grows readily from seed (previously soaked in hot water) sown in spring, but will stand very little frost. It may be trimmed, severely if necessary, but will not last more than about 7 or 8 years as a hedge. *Albizzia lophantha* is quite useless as permanent shelter, but in suitable circumstances it can be a very useful temporary measure with its advantage of extremely rapid growth.

[*Sparrow*

***Albizzia lophantha* (at back) is here used as protection for an *Acmena floribunda* hedge.**

Soils and Soil Conditions

It is true that most hedge and shelter trees are more tolerant than fruit trees, but it is not always appreciated that very few will thrive in poorly drained situations. If land to be used for planting is not naturally well drained, adequate provision for drainage should be made before planting is done.

Many soils are sufficiently fertile to maintain established shelter trees and hedges without cultivation or added fertilisers, but more attention is needed while the plants are young. It is desirable to get maximum growth in the first few years to benefit from the shelter as soon as possible. To that end the land should be prepared as carefully as for fruit or other trees. In addition it is an advantage to work in a fertiliser such as blood and bone at 2oz. to 4oz. to each square yard before planting. The fertiliser application should be repeated annually for 3 or 4 years or until the shelter is well established. Cultivation to suppress weed competition should be maintained for a similar period. Heavier fertiliser application may be necessary on very poor soils, but richer land may need none after that used at planting time.

Selection of Trees and Plants

Though it may be desirable, or even essential, to provide uniform rows of shelter of even height for commercial orchards or farms, that is by no means always necessary for home shelter. Around the home garden trees and shrubs may be of different kinds, heights, and habits of growth. Instead of being planted in straight rows, they may be set at varying distances from the boundary, yet so arranged that they will break cold or strong winds while blending with and forming part of the general garden layout. Formal hedges may be part of the plan, for they can be used where space is limited or for special purposes such as screens.

A further point which should not be overlooked when shelter is being planned and trees are being selected for closely settled districts is consideration of adjoining gardens. First, both the effectiveness and the beauty of new plantings may be enhanced by

co-ordination with their surroundings and, secondly, a little forethought may save unnecessary adverse effects on a neighbour's contributions toward the attractiveness of the environment.

Great importance must be attached to selection of trees and hedges of suitable proportions and habits of growth. It is essential that they be visualised as mature trees, lest they outgrow their allotted space and have to be mutilated to curb their natural vigour. Spreading trees should not overhang boundaries in restricted areas. Tall trees should not be planted beneath power or telephone lines. No large trees or hedges should be placed where they will eventually overshadow the house or interrupt an attractive view. A less frequent, but sometimes equally unfortunate, mistake is selection of a tree or hedge of a kind too small to fulfil its purpose. Certain trees lose their lower limbs as they mature and, though remaining attractive, become partially ineffective as shelter. Where sufficient space is available such trees may be used in combination with smaller trees of lower branching habit planted to stop the draught which otherwise would be caused.

On level land shelter trees 50ft. to 60ft. high give good protection from wind for 4 to 5 chains and partial protection for rather more than double that distance. It should not be forgotten that they will cast shadows which, in winter, will extend up to 150ft. to 200ft. on their southern sides. Smaller hedges give less shelter but cast shorter shadows. These factors have important bearings in relation to homes as well as to land on which trees or crops are to be grown.

Farms and large estate gardens may need tall shelter, which should be kept at a distance and supplemented, if necessary, by low intermediate hedges. On such properties there is scope for using large trees as well as shrubs and trimmed hedges. In small city sections few large trees or tall shelters can be used, because of the problems created by overcrowding and shading. However, tall shelter is seldom essential in built-up areas, for the force of strong winds is substantially broken by buildings and neighbouring trees and hedges. A few trees of moderate size, with shrubs and low hedges, serve to beautify the property and to give local protection to fruit trees, more delicate plants, and the vegetable garden, and to shelter lawns which may be used for recreation.

In general the kinds of trees and hedge plants commonly used for shelter have become popular because they are hardy in their locality, thrive in a variety of soils, and, in some instances, tolerate salt-laden winds. Observations of trees and hedges in the locality and consultation with nurserymen or other distributors of plants familiar with the conditions will help home gardeners when plants are being chosen.

Formal trimmed hedges, well chosen and maintained, can be very attractive but require regular attention. Naturally grown specimens, carefully selected and well placed, require less attention, but can be equally effective as shelter. In many situations a combination of the two forms may be used with effect for both utility and beauty.

Planting

Many hedge plants, ornamental shrubs, and trees will grow from cuttings. Some will root quite freely from hardwood cuttings set outside in the positions in which they are required. Others need more attention and must be rooted in shaded frames or pots before they are planted out.

When rooted plants are bought it is a mistake to attach undue importance to large size. The most important points are good health and an ample root system in relation to the size of the plant. A comparatively small plant with adequate roots is better equipped to establish and thrive than is a large plant with poor roots.

If large, well-grown plants are used, and they do have advantages if quick results are desired, it is essential that they should have roots in proportion to their size. It is necessary also to plant large specimens with special care, to ensure that they do not lack water, to shade them from hot sun, and, in exposed positions, to protect them from wind until they are well established in their new positions.

Before trees and hedges are planted the land should be well and deeply worked, preferably some weeks in advance to allow the loosened soil to

This 4-year-old feijoa hedge crops very well. [*Sparrow*

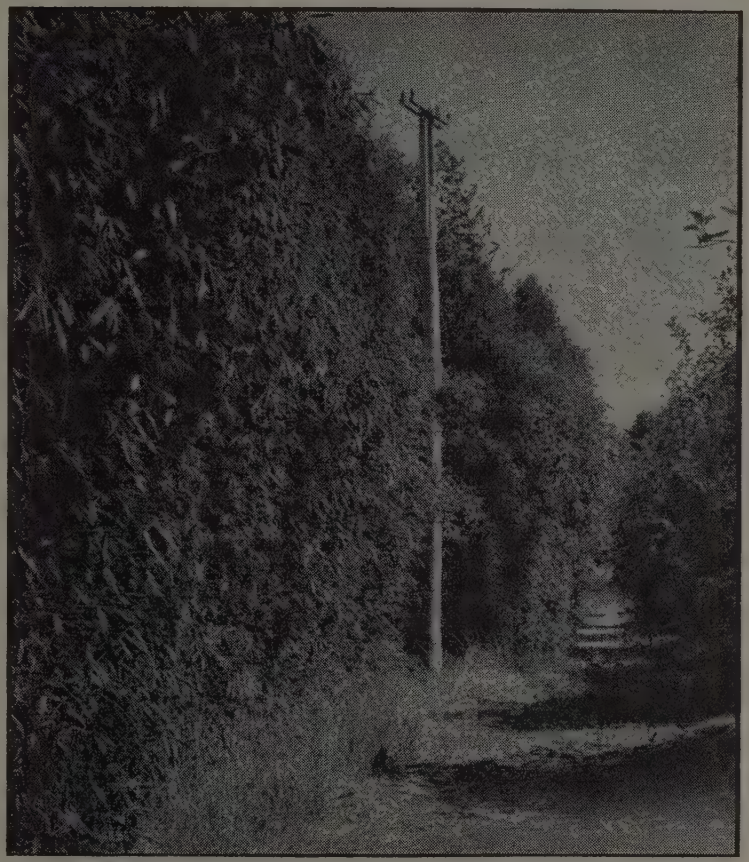
settle down. Planting holes should be large enough to allow full spreading of roots. Fertilisers or well-matured animal manures may be worked into the soil before planting or at the bottoms of the holes, but should not come into direct contact with the roots. In heavy clay soils it is necessary to dig a channel to allow excess water to drain from the planting hole; otherwise the roots may be injured in wet weather. The channel may be filled with loose soil.

Young trees and plants supplied "balled" or in pots must have the sacking or pots removed before they are planted. Twisted roots should be straightened, excessively long ones shortened, and all damaged ones trimmed. The balls of earth around the roots should be disturbed as little as possible and the trees should be planted promptly to minimise drying out of roots. If they are received some time before they can be planted, the trees should be opened up, trimmed, and heeled in until just before they are set out.

As a general rule it is best to set plants at the same depth as they were in the nursery or pot. Their roots should be spaced evenly, radiating outward and slightly downward. The hole may then be partly filled with soil, which must be pressed firmly down to give good contact with the roots and to hold the plants securely. At that stage water may be given in dry weather and the hole can then be filled.

Young trees which have poor root systems should have their tops trimmed to give a good balance between roots and branches. Cutting back is best done after planting, because then it is possible to prune to the best advantage for the shape of the tree.

Staking of tall specimens is essential. It is best to place the stakes when the trees are planted lest driving them later should injure important roots. Ties should be firmly attached to the stakes, but to allow room for growth they should pass loosely round the plant stems.



[*Rendell's*

A 6-year-old *Bambusa vulgaris* hedge protecting young apple trees.

Time to Plant

The time to plant in most parts of Auckland district is less critical than in colder parts of New Zealand. With some reservations, planting of trees and hedges may be done any time during winter or early spring. Deciduous trees and the hardier evergreens may be set out in winter, but in localities where frosts are more severe the less hardy evergreens should be held until spring. To avoid disappointment the plants may be purchased earlier but heeled in where they can be protected from frosts and cold winds until conditions are more favourable. However, planting should be done before spring growth starts and also early enough to avoid danger of the soil drying out before the trees develop new roots. Dull days are the best for planting, but in hot or dry weather the trees can be assisted by shading them for a few weeks.

Planting Distances

Large shelter trees which are not to be trimmed should be planted at distances which will allow reasonable space for normal development. Alternatively, they may be planted 6ft. to 8ft. apart in rows as is frequently done with *Pinus* or *Cupressus* species.

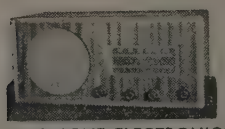
The larger types of plants for trimmed hedges should be spaced 4ft. to 6ft. apart, and the smaller kinds for low hedges should be set at 15in. to 20in. intervals to ensure close shelter and compact growth.

Trimming

In general, shelter trees and shrubs which are not to be formally trimmed require little attention except occasional cutting back of branches which develop in such a way as to spoil the symmetry of the plant. They may need treatment to remedy the effects of borers or diseases, and if it is practicable, broken branches should be cut back or supported to enable them to heal.

Shelters and hedges which are to be kept trimmed require more attention and must be given treatment from their first year of growth. Undoubtedly they will gain more height in their first few years if they are not cut back, but this initial advantage is usually at the expense of both effectiveness and appearance later, especially with the smaller, formal hedges. The shrubs and small trees used for hedges do not grow naturally in the compact, uniform way so desirable, but must be trained and encouraged to do so.

Trees such as *Cupressus* spp., *Pinus* spp., totara, and pohutukawa to be grown as tall trimmed shelters may need little except topping in their first few years, unless it is intended to confine them to very narrow limits. Topping is essential to encourage a low branching habit, and side trimming

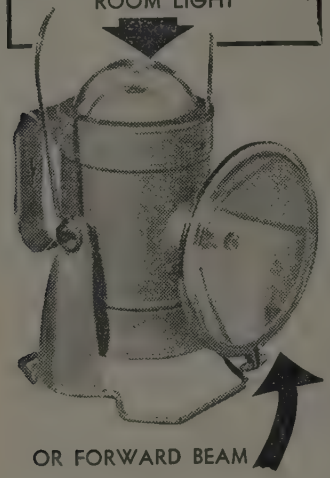


FLEET
Model F
Battery
Vibrator
AC
The Farmer's set

GISBORNE ELECTRONICS
Box 243
Gisborne

SPECIALS
for the man on the land

SWITCH TO ALL-OVER ROOM LIGHT



OR FORWARD BEAM

"Eveready" de-luxe
DUAL LIGHT
Hand Lantern

Safer, more compact and more powerful than any hurricane lamp. Switch selects powerful forward beam or upright lamp-light for all-over light. Adjusts to any angle, amazingly light, completely trouble-free, costs next-to-nothing to run.

An asset to any country home or farm.

Ask for "Eveready" brand Number 2546.

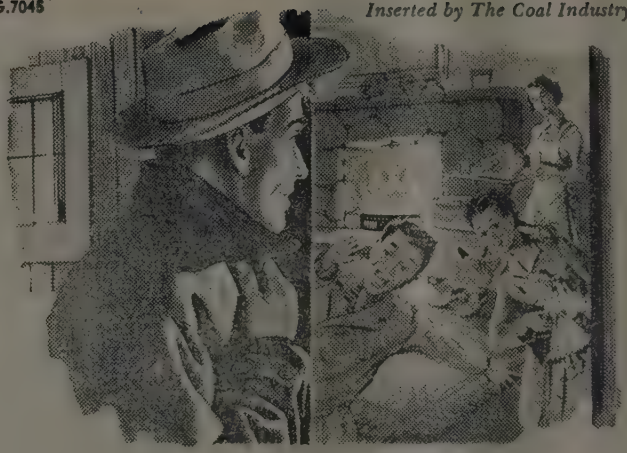
Insist on this guaranteed "EVEREADY" Brand Lantern — obtainable everywhere.

NATIONAL CARBON CO. PTY. LTD.,
VIVIAN STREET, WELLINGTON.

The term "EVEREADY" distinguishes Products of National Carbon Pty. Ltd. (Inc. in N.S.W.)

G.7045

Inserted by The Coal Industry.



To a warm farmhouse!

To return to an open fireplace where the coal is crackling merrily . . . to let its cheery warmth ease the tiredness of a wintry day in a far paddock . . . this you can enjoy only with a coal fire. Gives such natural, healthy warmth, too. Coal is the most economical fuel. Make sure you have a full coal bin. Order now!

VITAL TO THE NATIONAL ECONOMY

COAL
for a cheerful fire

Have you seen the latest fire grates? Modern in design, they use coal most sparingly, make it even more economical than ever!

"Confounded pests!"

Insect pests are responsible for tremendous losses of foodstuffs and agricultural products throughout the world. In "confounding" these pests Shell plays a very large role. The new Shell insecticides Aldrin, Dieldrin and Endrin have been developed to fight the battle against insect pests. These materials are very effective at low dosage rates and are most economical to use. They will be available in the form of wettable powders and emulsions which may be applied by high-volume or low-volume spraying. Among pests controlled by these insecticides are cutworms, wireworms, carrot rust fly, thrips, codling moth, white butterfly, cabbage aphis, and diamond-backed moth.

Supplies will be freely available shortly and full details may be obtained on request from The Shell Company of New Zealand Limited.

SHELL

aldrin dieldrin endrin

AD1.5

[*Sparrow*

A good hedge of *Tecoma capensis* planted 6 years.

should be begun well before the trees develop their planned width. If side branches are allowed to grow too long before they are cut back, they often fail to refurnish with lateral growth and die back, leaving bare, useless, and unattractive dead stubs. This applies especially to *Pinus* spp.

Smaller hedges need regular and rather severe topping and side trimming from the start. The former encourages low branching and the latter produces a dense, well-branched habit which later will stand the hard, fairly frequent trimming needed to retain the shape of the hedge and prevent it from becoming unduly wide.

Hedges must never be trimmed in such a way that they are wider at the top than at the bottom. Overhanging tops shade the lower parts, causing weak and thin growth and not infrequently death of lower branches. Ideally, hedges should be trimmed so that they taper to comparatively narrow tops, and this practice is very strongly recommended for hedges in positions where they may be somewhat shaded.

Time for Trimming

Annual trimming is usually considered sufficient for very large hedges. The best time to do this is in spring, because the cutting is fairly severe and regrowth to keep the hedge compact is more likely to be satisfactory at that time.

Smaller hedges usually require trimming two or three times a year, but some kinds will stand more frequent trimming if it is desired that the hedge shall always be kept immaculate.

Cutting in late spring and mid-autumn is all that some kinds will stand, but an intermediate light cutting during summer will not harm most of the common hedges if they need it. Cutting during or just before a period of frosts is inadvisable. Such treatment is not to the advantage of any hedge and may result in very serious injury to the more susceptible kinds. Hedge plants such as *Tecoma capensis* quickly recover from light frost injury, but may take much longer if the cold is able to penetrate more deeply through the opening up caused by severe heading back.

Until hedges reach their allotted sizes a little extension may be allowed, both vertically and laterally, at each trimming. With a mature hedge the aim is to trim closely and reduce extension to a minimum. Occasional more severe topping may be found necessary, but deep cutting of the sides must be done carefully or the hedge may become patchy and unsightly, especially if earlier trimming has been poor and inner branches are

REAR BETTER CALVES

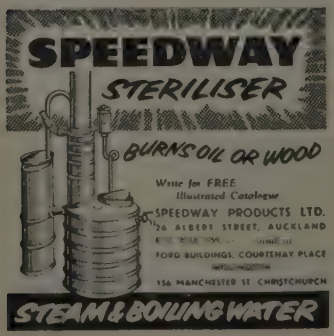
with

THIS IS THE PERFECT food for calves, and can, if necessary, replace milk completely in the feeding of calves, from 3 weeks old. If you're feeding skim or whey, only very small quantities of Tomoana Milk Solids Calf Meal are needed. Available in plain sacks or attractive printed calico bags.

ORDER FROM YOUR PRODUCE MERCHANT OR DAIRY COMPANY

WRITE to W. & R. Fletcher (N.Z.) Ltd., Box 594, Wellington, for leaflet giving full details of this perfect food for calves.

G.7137



Secure, Simply-erected Netting Fences...

Erect your Turnip Breaks, Docking Yards, etc., the modern way and solve your temporary fencing problems. Use the new

"CLING" Steel FENCING STAKES

"Cling" Stakes are easily transferable, easily handled, requiring no staples. They provide a complete fence and straining unit, are ideal for all types of netting and will not deteriorate.

Available from Stock & Station Agents, Mercantile and Hardware Firms everywhere. Imported and Distributed by Clark & King, P.O. Box 814 Invercargill.

*ARE YOU?

More than 15,000 N.Z. Dairy Farmers are...* using the

'Ruakura' VACUUM REGULATOR

Why? Because they obtain Maximum yield from their Herds without risk of udder injury.

Recommended by Ruakura Research Station;
Approved by The National Institute for Research in Dairying, Shinfield, England.
Awarded silver medal London Dairy Show, 1953;
Certificate of Merit, Bath and West Show, England, 1954.

Order from your milking machine maker or supply house, stating setting required.

PRICE **62/-** each.

Manufactured by PLASTIC PRODUCTS LTD., HAMILTON, NEW ZEALAND.

not sufficiently numerous to fill the gaps.

Hedges Suitable to Auckland Climate

Some of the most suitable trees and shrubs for use as shelter in the Auckland district are listed below, with brief notes concerning the uses to which they may be put. This list covers only the hardier kinds most frequently used as shelter trees or hedges. Many others are quite hardy, but for various reasons are less suitable as shelter.

Tall Trees for Rows

For situations that require tall shelter in either single or multiple rows the following varieties should prove satisfactory:—

Chamaecyparis lawsoniana (Lawson's cypress) grows to 40ft. (occasionally to 70ft.). It stands trimming, but will make a very good untrimmed shelter. This variety is susceptible to cypress canker, does not stand salt winds well, and requires good drainage.

Corynocarpus laevigata (karaka) grows to 20ft. to 40ft. It stands salt wind well and is ideal for specimen trees, but does not hold low branches well.

Cryptomeria japonica (Japanese cedar) is a most attractive type of shelter tree, growing to 60ft. high. It stays dense to ground level for at least 20 years, and stands trimming and some salt winds. This variety is easy to transplant and should be planted 6ft. to 9ft. apart.

Cryptomeria japonica, var. *elegans* is a very different tree from the *C. japonica* listed above. It has a different shape and its foliage turns an attractive reddish colour in autumn. It grows more slowly and reaches a height of up to 30ft. It will not tolerate salt winds; it retains its lower branches very well.

Cupressus benthami grows to 50ft., does not stand salt winds well, and stands trimming provided it is regular and not too drastic. It is an ideal shelter hedge variety which appears reasonably resistant to cypress canker disease.

Cupressus macrocarpa grows to 60ft. and more, stands salt winds, and makes a good solid shelter and provided trimming is done regularly and not too drastically, stands trimming well. It has a tendency to spread widely if not trimmed.

Cupressus torulosa grows to 40ft. and seems very resistant to cypress canker.

Dacrydium cupressinum (rimu) grows to 50ft. It is a good specimen tree, but should be protected from wind when young. It is not suitable for trimming.

Hakea saligna grows to 10ft. to 30ft. It stands trimming very well and makes an ideal hedge; it does particularly well in North Auckland districts, and will stand frost.

Metrosideros tomentosa (pohutukawa) grows to 40ft. It stands salt winds particularly well, will stand trimming, and makes a very compact hedge suitable for large breakwinds near the coast.

Pinus radiata grows to 60ft. and more It stands some salt winds and grows very rapidly. It is not suitable for severe trimming, but will stand some light cutting back if done annually.

Pinus muricata grows to 50ft. and more, stands salt winds well, and grows quickly. Trimming is as for *P. radiata*.

Podocarpus totara (totara) grows to 40ft. and more. It tolerates some salt, may be trimmed, and may be used as a specimen tree.

Populus fastigiata (Lombardy poplar) (syn. *P. nigra* var. *stricta* and *P. italica*) grows to 80ft. It is frost resistant, stands trimming well, and being deciduous does not shade heavily in winter.

Quercus robur (oak) grows to 40ft. and more. It stands very heavy wind well, but does not retain low branches. It is best as a specimen tree.

Salix babylonica (weeping willow) grows to 30ft. It grows well in damp places and stands drastic cutting back and some salt winds.

Vitex lucens (puriri) grows to 50ft. It stands salt winds well and may be cut back but not trimmed. It does not retain its lower branches.

For Shrubs and Medium and Low Hedges

For shrubs and medium and low hedges the following varieties are suitable:—

Abelia floribunda is a vigorous grower and will go up to 10ft. It stands hard trimming and should be trimmed twice a year, in spring and autumn. It will not stand salt winds.

Acacia baileyana is a very pretty specimen tree with abundant yellow clusters of ball-like flowers and is one of the first to come out in spring. It is not suitable for trimming.

Acacia verticillata: A prickly hedge plant which grows up to 10ft. It stands trimming, which must be done regularly. It stands salt winds, but has rather a short life in Auckland districts.

Acmena floribunda (syn. *Eugenia smithi*) is an excellent specimen tree which can be trimmed regularly but will not stand much frost or salt winds. It makes a very good strong hedge.

Albizzia lophantha is usually grown from seed sown in spring in rows where required. It has a short useful life (7 to 8 years) as a hedge, and is unsuitable as permanent shelter. It is subject to frost injury when young, but grows extremely rapidly in warm districts. It is very useful as temporary shelter or, if there is room to use it, to hasten growth of a permanent hedge by protecting the plants for a few years. It may be trimmed severely to from 5ft. to 10ft. in height.

Bambusa vulgaris (bamboo): This variety of bamboo can be readily kept in check by trimming the sides. It grows to 25ft. and stands light frost only.

Buddleia salvifolia (common buddleia) is a quick growing plant which has pale blue flowers in winter. It can be trimmed, stands frost, and grows up to 12ft.

Coprosma baueri (taupata) should be trimmed twice a year. It is useful as a small to medium sized hedge and is hardy and fairly resistant to salt injury.

Escallonia exoniensis and *Escallonia rubra* are excellent varieties which stand trimming well and make very compact hedges.

Eucalyptus leucoxylon rosea (syn. *campbelli*) and *Eucalyptus ficifolia* may be used as specimen trees in a mixed planting.

Euonymus japonica is quite an attractive variegated variety which makes a large hedge and stands trimming and frost.

Feijoa: There are several varieties and it is advisable to plant more than one for cross-pollination. These are suitable for dividing hedges, either trimmed or in the natural form. If trimmed annually in spring, even quite severely, they will still bear some fruit. These trees are fairly hardy. They should be planted 6ft. to 12ft. apart, or closer if they are to be trimmed.

Ligustrum sinense (privet) will grow almost anywhere. It stands heavy trimming, frost, and wet ground conditions, and is the ideal hedge for conditions that are really tough.

Lonicera nitida is a slow growing hedge which usually does not grow higher than 6ft. to 8ft. and is easily maintained in neat condition with light trimming.

Phormium tenax (New Zealand flax) grows to 6ft. to 10ft. and is easy to grow. Once established it needs little attention and is very hardy as to winds, temperature, and salt winds, and will grow in damp but not waterlogged conditions.

Pittosporum crassifolium (karo), *Pittosporum eugenioides* (tarata), and *Pittosporum tenuifolium* (kohuhu) all make good medium sized hedges. They may be trimmed twice a year with advantage. Growth is good. They should be planted 2ft. to 3ft. apart.

Tecoma capensis is an ideal hedge for frost-free areas. It needs a fence or some type of support and needs trimming several times a year. It makes a compact, small hedge and is usually used for hedges from 5ft. to 10ft. The illustration on page 585 shows a good one grown in Remuera, Auckland.

Veronica elliptica is useful for a small hedge and stands trimming.

Care of Livestock during July

Contributed by the Animal Research Division

PULPY KIDNEY IN LAMBS

WHERE pulpy kidney occurs in lambs under 6 weeks of age its incidence can be reduced by vaccinating the ewes before lambing. If ewes have never been vaccinated, best results will be obtained from two doses of vaccine given at least 1 month apart. Ewes which were vaccinated last year will require only one vaccination. The last (or the only) vaccination should be given about a fortnight before lambing and this can be done quite safely if ewes are handled carefully. Very poor immunity results where the ewes are vaccinated much earlier. If most losses from pulpy kidney occur in lambs over 6 weeks of age, vaccination of ewes is of no value, but vaccination of lambs at marking may help.

RINGWORM IN CALVES

Ringworm in calves is sometimes troublesome, especially in poorly nourished calves. Before any remedy is applied the scales should be removed by rubbing in a mixture of equal parts of soft soap and lard and scraping off the softened scabs the next day. The bare patches should then be dressed with an ointment consisting of 1 part of salicylic acid and 8 parts of lard or any registered stock remedy for ringworm which is available. As the infection can be transmitted to man, it is wise to wear rubber gloves when treating ringworm. In any case the hands and arms should be thoroughly washed immediately after the dressings are applied.

ERGOTISM IN CATTLE

Hay made from ergotised grass will cause lameness and sometimes even loss of fect in cattle. The small black ergots which replace the seeds of ryegrass and other grasses can easily be seen, and if they are present in large numbers, the hay should not be used. Similar trouble often occurs when cattle are grazed on tall fescue grass even when no ergots are present. This grass should be regarded as poisonous and should not be grazed by cattle.

WINTER FEEDING OF COWS

It is imperative that cows should be well fed for 6 to 8 weeks before calving. They should have access to hay at all times, and if the pasture is poor, they should also receive up to 20lb. of silage per day. Early calving cows should be given about 2 hours' grazing per day on autumn-saved pasture and in addition should be fed as much silage as they will eat.

MILKING METHODS ARE IMPORTANT

At the start of a new season cows should be trained to let down their milk quickly and completely by the establishment of a fixed milking routine so that the cows are brought into the shed, bailed up, washed, and milked in the same way at each milking. Anything which upsets the cows must be avoided. A brief but vigorous wash followed by the withdrawal of a squirt of milk from each quarter into a strip cup is the best method of stimulating the flow of milk. This will also help in detecting cases of mastitis early. As the duration of let-down is limited, cups should be put on immediately after the washing and starting process. A good milk-flow indicator should be used, and as soon as this shows that milk flow has slowed to ¼lb. per minute the cups should be pulled down until milk flow again falls to this rate, when they should be removed at once. Massaging of the udder while the cups are pulled down should be practised only with cows which are known to need it.

BLOOD POISONING IN EWES AND LAMBS

Losses from blood poisoning in lambing ewes and marked lambs can be greatly reduced, if not eliminated, by vaccinating the ewes with blackleg vaccine about a fortnight before lambing. As the immunity, which passes from the ewe to the lamb in the first milk, does not persist for many weeks, lambs should be marked early. To obtain the best results it may be necessary to divide the ewes into early and late lambers, which should be vaccinated separately before lambing. Advice concerning vaccination can be obtained from any office of the Department of Agriculture. Where possible ewes should lamb in clean spelled paddocks, and lambs should always be marked in clean temporary yards. Sometimes losses from blood poisoning occur in lambing ewes that have not been vaccinated. If losses are occurring, it is too late to vaccinate. It may be possible to save some ewes by treating them with penicillin if it is used early enough. It is important that blood poisoning be confirmed, and the local veterinarian should be consulted in this matter. After such confirmation all ewes which are assisted in lambing should be treated by penicillin injection. This should be an emergency measure and should not replace vaccination, which is the cheapest and most certain means of treating blood poisoning.

SLEEPY SICKNESS IN EWES

Heavy losses from sleepy sickness sometimes occur in ewes carrying twins or heavy single lambs. These losses may be prevented by ensuring that ewes do not suffer a check just before lambing. If necessary, ewes should be divided into early and late lambers and drafted on to the best feed available 3 to 4 weeks before lambing. Research has shown that poor feed for 5 weeks before lambing can reduce the fleece weight by more than ½lb.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during April and for the 9 months ended 30 April 1955, with comparative figures for the same month and 9-monthly period of 1953-54, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage Inc. or dec.
April 1955	6,731	207	6,938	—
April 1954	6,974	216	7,190	—
Increase or decrease ..	—243	—9	—252	—3.504
9 months ended 30/4/55	144,407	2,878	147,285	—
9 months ended 30/4/54	138,560	2,876	141,436	—
Increase or decrease ..	+5,847	+2	+5,849	+4.135

Butter in store at 30 April 1955 was 25,800 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage Inc. or dec.
April 1955	4,770	1,741	6,511	—
April 1954	7,443	28	7,471	—
Increase or decrease ..	—2,673	+1,713	—960	—12.849
9 months ended 30/4/55	73,293	19,781	93,074	—
9 months ended 30/4/54	93,008	187	93,195	—
Increase or decrease ..	—19,715	+19,594	—121	—0.129

Cheese in store at 30 April 1955 was 32,510 tons

If these figures are converted into butterfat equivalent, there is an increase of 3,159 per cent. in butterfat graded for the 9 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

Land Development: Chewings Fescue Seed

Seasonal Notes by the Extension Division

PLANS for clearing and cultivating virgin and reverted scrub land should now receive consideration so that each operation may be carried out as efficiently and economically as possible. Scrub must be cut or crushed and burnt and this is now usually done by a tractor scrub bar or blade or a heavy flanged roller. Cultivation plans will vary with the class of land, but the work must be so arranged that a firm, fine, moist seed-bed is prepared and yet so done that excessive soil erosion is prevented during preparation. For this reason disced hill country is usually left to fallow after only one cut of the giant discs. The one working leaves sufficient worked land to weather and yet not sufficient for erosion to occur during the necessary long fallow.

NORTHLAND GUMLAND

AFTER the scrub cover has been cleared and burnt the cultivation of virgin gumland soils should begin with a giant discing in May. After this working the land should be left to weather over winter and cultivation started again in spring with tandem discs as soon as the land is ready to work but before it has dried out. The land should then be worked periodically with harrows over summer and the necessary 1 to 2 tons of lime applied. Early sowing is desirable on gumland and the seed-bed should be ready by the middle of February so that the seed may be sown as soon as the weather is favourable. The land should be rolled before sowing if it is in a suitable condition to give the desirable surface consolidation for the germination of grasses and clovers. Some discretion is, however, necessary in the use of the roller, and rolling should be omitted if the surface is too moist and liable to cake, which it often is if sowing time is unduly delayed into late autumn. Drainage is important on gumland and while preliminary cultivation work is proceeding attention should be given to draining wet patches with tile or fascine drains. On steep areas the drainage of wet patches is not easy and drain grades must be carefully adjusted to avoid erosion.

—J. E. BELL

* * *

SOUTH ISLAND LAND DEVELOPMENT

IN the development of tussock, fern, and scrub land annual fodder crops are normally taken before the land is sown to grass. On all ploughable land where depth of topsoil will permit burial of tussock or fern the area is ploughed, usually with a heavy swamp implement in late autumn to early winter and fallowed. Initial breaking up by giant discs has not proved generally satisfactory, especially where heavy tussock or fern growth is encountered, and best results have followed deep ploughing where soil depth permits this. On shallow soils disc and cultivator have proved most efficient in preparation for the first crop or pasture. Land so prepared is then worked down, limed to requirement, and sown in spring in swedes or turnips, ridged or drilled according to soil and climate. This crop is fed off in breaks and provides useful supplementary fodder as well as a valuable build-up in fertility through consolidation, stock droppings, and urine. The second crop may be turnips after swedes or chou moellier, and after this is fed off in breaks permanent pasture is drilled from November to January, sometimes with a light seeding of rape. Successful alternatives are sowing of temporary pasture after the fallow or in lighter rainfall districts the use of ryecorn as a first crop. Since drilled pastures, especially under dry conditions, are often slow to provide even cover, a modern adaptation, the mounting of separate pasture seed and fertiliser boxes on the roller for broadcast sowing, is giving good results. Modern heavy equipment. usually employed on contract, has facilitated rapid clearing of light bush and cut-over timber areas, many acres of which have been prepared for cultivation by one of the methods already described. Tall manuka areas have been efficiently cleared by two tracklaying tractors drawing a heavily weighted anchor chain which uproots growth to be gathered by the toothed blade of a bulldozer, ready for burning off in windrows. Surface sowing of a pasture seed mixture with fertiliser following burning of fern or light manuka growth has been satisfactory, provided good utilisation by stock concentration and spelling is practised. On unploughable hill country and rough gullies aerial topdressing with phosphates (including molybdenum where this has been proved deficient) and a light seeding of grasses and clovers have given good results. Carrying capacity on this formerly virgin land has been increased in 3 years from less than one to over three ewes per acre, which is a valuable contribution to the desired production increase from already established areas.

—A. G. ELLIOTT

* * *

RENOVATION OF CHEWINGS FESCUE STANDS

THE home of chewings fescue seed production is the Mossburn-Five Rivers Plain in northern Southland. With the remunerative prices ruling over recent years for wool and lamb, large areas in these districts have been developed from third-class into first-class land. Once this land has been improved chewings fescue seed is no longer produced, nor would it be desirable. The twitchy habit of the chewings fescue plant results in the stand becoming sodbound, and in this condition very few seed heads are produced and the vegetative production is extremely low. This could happen after one seed crop on first-class land.

On fescue-producing farms areas are spring sown with a seeding of 20lb. per acre of dressed seed, as purity is important. Seed is harvested in summer, 12 months hence. This block is grazed for the next season, as it is not normal practice to harvest the same block in 2 successive years. A second, lighter crop is then taken, and in the following July the stand is renovated by ploughing. The furrow turned is usually 9in. wide and as deep as the shallow, stony soil permits, usually 5in. or 6in. The furrow is turned to lie in weatherboard fashion, and the plants emerge in rows along the line where the second furrow slice lies on the first. If the furrow was turned over completely, very few plants would survive, and if the land was ploughed too early, the winter disintegration causing the edge of the second furrow to fall on the first furrow would result in a smother and poor survival. With this method of renovation in any one season approximately one-quarter of the farm is harvested for seed, one-quarter is ploughed, and the remaining half is under grazing by sheep. A block can be renovated three or four times before excessive weed invasion makes resowing imperative.

—A. STUART

* * *

PEAT

WHERE peat is fairly consolidated an annual topdressing of 2cwt. to 3cwt. of phosphate and ½cwt. to 1cwt. of muriate of potash will usually ensure excellent clover growth. On raw peat, however, growth may also be limited by excessive acidity, and lime must be applied to correct this. Lime is very slow to move downward in peat, so there is a limit to the amount which can be usefully applied to the surface—probably not more than 1 ton per acre. Where possible the lime should be worked in before the pasture is sown so that the acidity is corrected to a greater depth. This encourages a deeper-rooting system. The plant roots are then able to draw their nutriments from a deeper band of peat and are less liable to be affected by drought.

—G. L. BANFIELD

WALLACES Bring Milker Prices DOWN

. . by passing on reductions to the farmer. You can save many pounds on the purchase of your next milking machine if you investigate this opportunity which is made possible by more efficient production methods, savings on purchase of materials and increased sales with resultant lower overhead expenses. In justice to yourself you MUST COMPARE these prices before purchasing, as WALLACE'S PRICES cannot be beaten.

POST THIS COUPON NOW!

Messrs. D. McL. Wallace Ltd.,
P.O. Box 9010, Newmarket.

Please send me full details of the Wallace Super Milker.

Name .....

Address .....

.....

WALLACE SUPER STANDARD MILKER

RELEASER MODELS	2 COW	3 COW	4 COW	5 COW	6 COW
SINGLE UNIT	£140	£160	£182	£210	£232
DOUBLE UNIT	£164	£197	£235	£270	£304

WALLACE SUPER STREAMLINED MILKER

RELEASER MODELS	2 COW	3 COW	4 COW	5 COW	6 COW
SINGLE UNIT	£158	£179	£202	£230	£251
DOUBLE UNIT	£182	£216	£255	£290	£324

Quotations on request for mechanical releaser and milk-pump units, also stainless steel components.

D. McL. WALLACE LTD.

HEAD OFFICE: NEWMARKET AUCKLAND

Branches at:—

Hamilton, Thames, Te Aroha, Matamata, Whakatane, Rotorua, Whangarei, Dargaville, New Plymouth and Stratford.

South Island Representatives: T. H. Phipps & Son., P.O. Box 722, Christchurch.

Ti-Tree Takes a Ton of Clearing But-

with an Oliver "OC 3" Crawler Tractor teamed to giant discs it becomes just one of the easy jobs! Yes, you just can't doubt the rugged Oliver "OC3's" fighting power once you see this stout-hearted tractor in action! Actually illustrated is an Oliver "OC3" with giant discs simply "mowing down" 12-foot high ti-tree on Mr. J. Sharland's property, "Ferncourt," Te Miro, Cambridge. The Oliver "OC3" of 22 Drawbar H.P. is available in centre-to-centre track widths of 68, 60, 42 and 31 inches.

SOLE NEW ZEALAND DISTRIBUTORS:

FREDERIC W. SMITH LIMITED

8-12 The Terrace, Wellington. 144 Carlyle St., Christchurch.

THERE IS AN OLIVER DEALER IN YOUR DISTRICT!

Oliver feature a range of six tractors from 22 to 130 D.B.H.P.

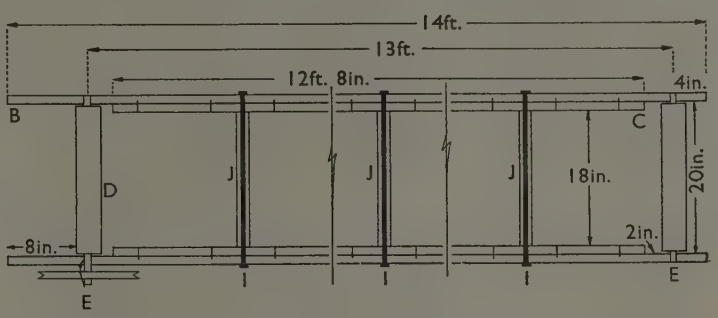
Elevator for Cleaning Poultry Houses

By J. H. JONES, Poultry Instructor, Department of Agriculture, Oamaru

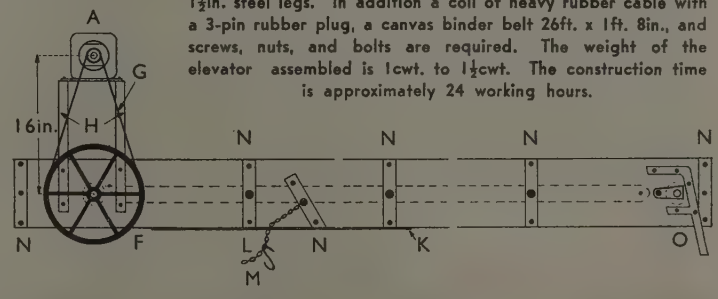
IN these days of increasing labour costs it is essential that the poultry farmer, by skilful management and use of every mechanical aid at his command, runs the maximum number of birds efficiently without recourse to expensive outside assistance. In this article details are given of an electrically powered elevator which has been used with considerable success and saving of labour by a South Canterbury poultry farmer for clearing litter from his poultry houses.

THERE is no doubt that one of the most irksome tasks on the poultry farm is the annual cleaning out of the litter from the pens. This, if the farm is a sizable unit, can often take several weeks of hard work, usually in the heat of summer and at a time when more essential and important jobs need to be done.

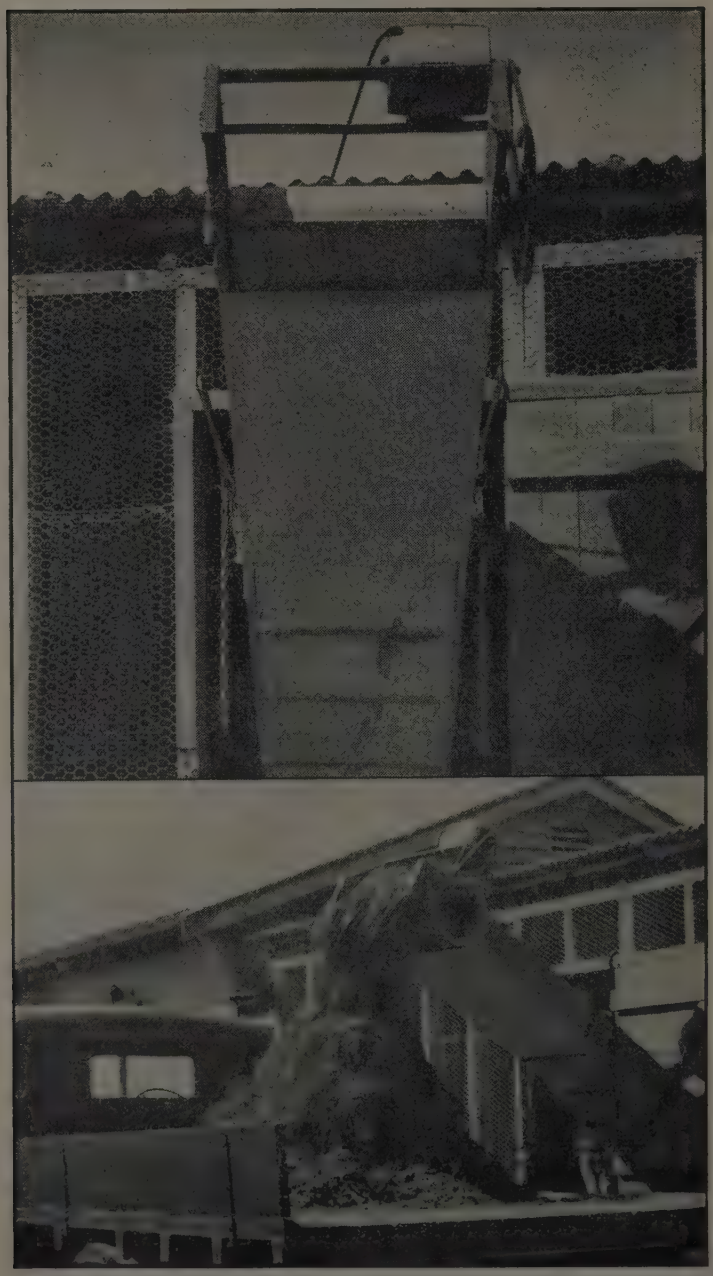
The design and construction by an Oamaru poultry farmer of a mobile electrically powered elevator to assist in cleaning out poultry houses was therefore watched with great interest, and its subsequent operation on a large South Canterbury poultry farm proved to be very successful. It was found to speed up the work fourfold; by using the elevator two men cleaned out the same number of sheds in half the time it had previously taken four



Above—Top elevation with canvas removed. Below—Side elevation. The components required are: A—½ h.p. electric motor with 2in. V pulley. The motor and wiring should comply with the requirements of the New Zealand Wiring Regulations and Amendments covering portable appliances. B—Two 14ft. x 8in. x 1in. lengths of dressed Oregon or rimu for the sides. C—Two 13ft. x 2in. x 1in. lengths of dressed rimu for the runners for the binder belt. D—Two 3in. x 1ft. 8in. hardwood rollers with steel rod cores. E—Two sets of plain metal bearings for hardwood rollers. F—12in. V pulley wheel to fit to end of hardwood pulley shaft. G—Agricultural A section belt to drive rollers. H—Two 1½in. x ¼in. iron brackets to hold motor, their size depending on the length of the V belt. I—Three ⅜in. x 2ft. steel tie rods threaded at both ends. J—Three ½in. x 1ft. 6in. steel pipes to be used as spacers. K—2ft. x 3ft. sheet of flat galvanised iron to be used as under guard. L—Two 3ft. suspension chains. M—Two meat hooks for attaching to chains to support elevator. N—Fourteen ⅛in. x 8in. x 1in. iron straps. O—Two ¼in. x 1ft. x 1½in. steel legs. In addition a coil of heavy rubber cable with a 3-pin rubber plug, a canvas binder belt 26ft. x 1ft. 8in., and screws, nuts, and bolts are required. The weight of the elevator assembled is 1cwt. to 1½cwt. The construction time is approximately 24 working hours.



The assembled elevator, showing the general details of construction.



Upper—A view of the underside of the elevator, showing the belt shield and the method of suspension. Lower—The elevator in operation. The position of the motor keeps it out of the way of dust and damage.

The loading base is mobile and can be moved in any direction.

men. On this 3000-bird unit there is no doubt that on the first year's operation the construction cost of the elevator has been recouped by decreased labour costs.

As can be seen by the illustrations the elevator is of a relatively simple design, and with the aid of a plan and a little assistance from the local garage its construction could quite easily be undertaken by any poultry farmer. The cost of the component parts of the elevator illustrated, if all are bought new, is approximately £35. The most expensive item, however, the ½ h.p. electric motor, is very often already on the farm and in the majority of cases could be adapted for use on the elevator.

Applications for Permits to Import Livestock

APPLICATIONS for permits to bring animals or birds into New Zealand must now be made in writing to the Director of the Animal Industry Division, Department of Agriculture, P.O. Box 2298, Wellington.

Before an amendment was made to the Stock Act in 1952 permits to import certain animals and birds were issued by the Department of Internal Affairs, which is still receiving numerous requests for permits.

Before any arrangements are made to obtain livestock from overseas intending importers are urged to approach the Department of Agriculture to ascertain whether the animals or birds concerned can be brought into New Zealand. This will avoid disappointment later if permission for an animal to enter the country is refused after it has arrived here.

TOLERANCE OF PASTURE GRASSES TO T.C.A.

RESEARCH work to date has proved that T.C.A. is a selective grass killer and as such is a valuable chemical for control of weeds not normally killed by hormone weedkillers. A trial laid down at the Department of Agriculture's Experimental Area at Marton was designed to test the tolerance of four pasture grasses to T.C.A.

RATES OF APPLICATION

PURE stands of short-rotation ryegrass, perennial ryegrass, cocksfoot, and timothy were sown at 40lb. per acre in March 1953. The trial was divided into three blocks, one of which was sprayed with T.C.A. 4 months after sowing, one 8 months after sowing, and the third 12 months after sowing. The rates of application were increased as the grasses became more mature.

The rates used were as follows:—

TIME OF APPLICATION AND RATES OF T.C.A.

Months after sowing	Per acre
4 (July)	5lb., 10lb., and 20lb.
8 (November)	10lb., 20lb., and 40lb.
12 (March)	20lb. and 40lb.

The effect of T.C.A. on the density of the grasses was measured by point analyses; one analysis was made just before each application and a second was made on each block when the treatments had taken effect.

DAMAGE TO GRASSES

Five pounds of T.C.A. were applied only at the early stage of growth (4 months after sowing). Timothy was the only grass to be severely damaged by this application.

Ten pounds were applied both at 4 months and at 8 months after sowing. This rate caused a slight reduction in the density of all grasses, but was particularly severe on timothy when applied 4 months after sowing. Perennial ryegrass and timothy were both more tolerant to 10lb. after 8 months' growth than after 4 months' growth, but this did not apply for cocksfoot and short-rotation ryegrass.

The 20lb. rate (used at all three applications) severely damaged all grasses at 4 months and 12 months after sowing, but when applied 8 months after sowing it caused no significant reduction of any grass. The table at the foot of the previous column shows the depressive effect of 20lb. of T.C.A. applied at the three different times.

PERCENTAGE REDUCTION IN DENSITY OF GRASSES FROM AN APPLICATION OF 20LB. OF T.C.A.

Application time after sowing	Short-rotation ryegrass	Perennial ryegrass	Cocksfoot	Timothy
Months	Per cent.	Per cent.	Per cent.	Per cent.
4	40	81	59	85
8	36	43	30	17
12	70	57	65	56

The 40lb. applied at 8 and 12 months after sowing was very severe on all grasses, especially at the later stage.

All grasses, excepting timothy, were resistant to 5lb. and 10lb. of T.C.A. applied 4 months after sowing, and all grasses, including timothy, were resistant to 10lb. applied 8 months after sowing. Timothy proved to be the most susceptible grass at the early application and the most resistant grass at the 8 months' application. Both the heavier applications (20lb. and 40lb.) severely affected all grasses, but 20lb. sprayed 8 months after sowing caused less damage on all grasses than when sprayed at 4 and 12 months after sowing. The later 40lb. application did more damage to short-rotation ryegrass and timothy than the 40lb. applied 8 months after sowing, but time of application after sowing made little difference to the amount of damage to perennial ryegrass and cocksfoot. However, when the average amount of damage of the 20lb. and 40lb. applications is considered it is seen that spraying 8 months after sowing has caused the least harm.

Forty pounds of T.C.A. caused more damage on short-rotation ryegrass, cocksfoot, and timothy than did 20lb., but on perennial ryegrass the heavier rate was no more severe than the 20lb. rate.

DISCUSSION OF RESULTS

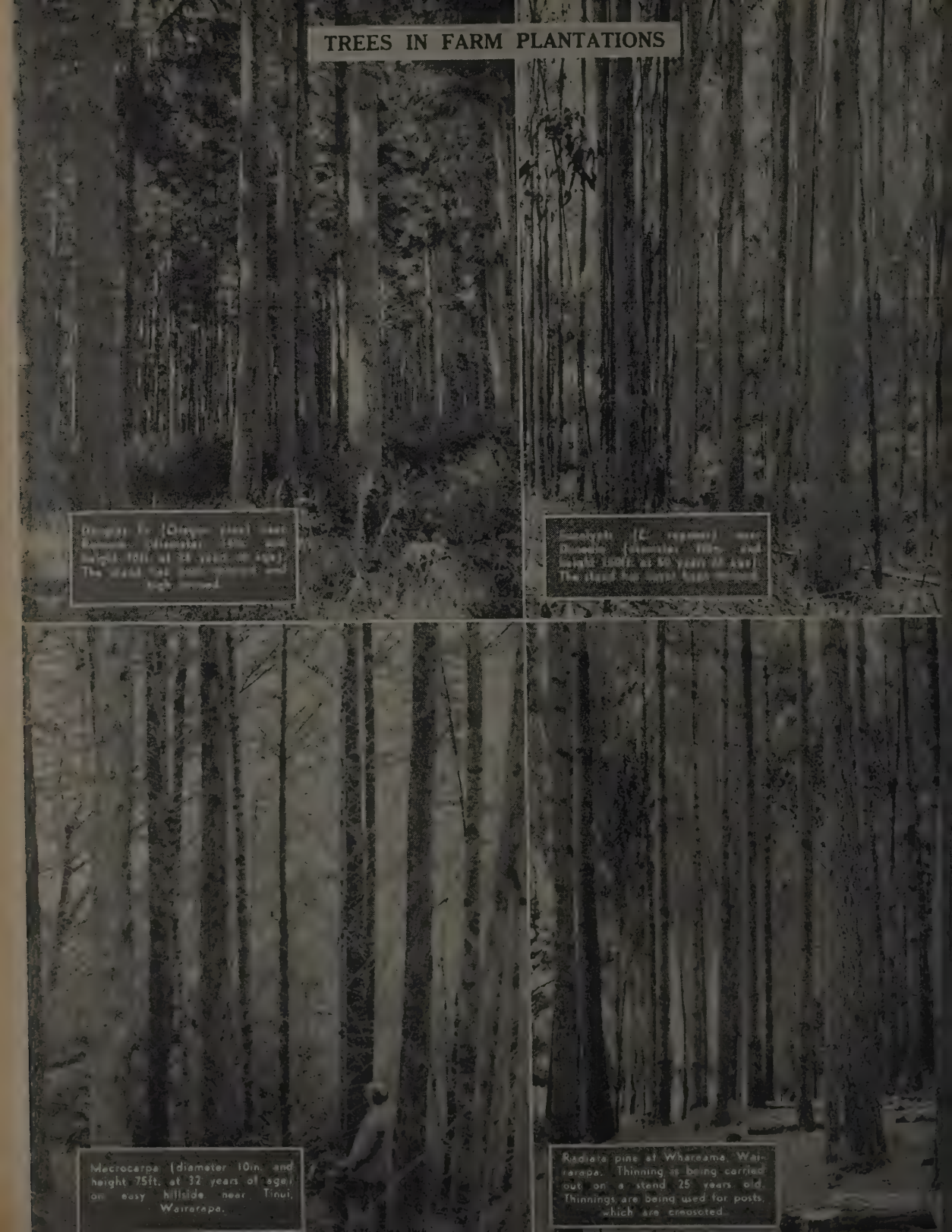
This trial has indicated that applications of T.C.A. at rates above 10lb. per acre may severely damage short-rotation ryegrass, perennial ryegrass, cocksfoot, and timothy. It also indicated that both the time of application after sowing and the season may markedly affect the susceptibility of the grasses to damage. Applications of T.C.A. in November, 8 months after sowing, caused less damage than at 4 and 12 months after sowing. Whether this effect is due to the season or to the age of the grass in relation to time of sowing cannot be determined from a trial of this nature. It would be interesting to see if a similar result was secured in another year. For example, in the trial under discussion much more rain fell after the applications 4 and 12 months after sowing than after the application 8 months after sowing. No rain fell for over a week before and after the trial was sprayed in November (8 months after sowing), but in July and March (4 and 12 months after sowing) plenty of rain fell both before and after spraying.

T.C.A. was not equally toxic on all four grasses compared. Timothy, for example, was more susceptible to 5lb. and 10lb. per acre than was short-rotation ryegrass, perennial ryegrass, and cocksfoot when applications were made 4 months after sowing, but timothy proved more resistant than the other grasses to damage from applications made 8 months after sowing.

—SHONA M. MACLEAN and F. HELEN THORNTON

HEADING PHOTOGRAPHS: Left—The unsprayed plot (control) shows a dense sward, 18 months old, containing vigorous timothy. Right—The results from an application of 40lb. of T.C.A. 12 months after the timothy was sown. The photograph, taken at the same time as that at left, shows a few surviving timothy plants, many flat weeds, and bare ground.

TREES IN FARM PLANTATIONS



Macrocarpa (diameter 10in. and height 75ft. at 32 years of age) on easy hillside near Tinui, Wairarapa.

Radiata pine at Whareama, Wairarapa. Thinning is being carried out on a stand 25 years old. Thinnings are being used for posts, which are creosoted.

Trees on the Farm

Choice of Species

IN the establishment of a woodlot the choice of species is the only part of the job which requires more knowledge than the average farmer is likely to possess. The possibilities are legion, but some species, comparatively few, have proved favourites for various reasons. It is these few species that are discussed in this article by W. H. Jolliffe, Officer in Charge, Extension Forestry, New Zealand Forest Service. The article is the fourth in a series on trees on the farm, the previous ones having appeared in the March, April, and May issues of the "Journal" respectively.

FOR many years radiata pine (*Pinus radiata*) has easily held the paramount position among plantings throughout New Zealand. Radiata pine achieved this position because of its very rapid growth, its suitability for a wide range of sites, and its ease of establishment. It will continue to be popular, especially in the southern half of the North Island and most of the South Island, for a quick yield of timber or fencing material (after creosoting), for the rapid suppression of noxious weeds, and as an antidote for erosion.

There are many other species, however, whose timbers are of greater value for certain purposes and which are well worth growing on suitable sites. As a guide to selection some points on the factors affecting the choice of species will be given, but preferences shown by certain trees will vary with the latitude of the growing site. For instance, a tree quite at home at sea level in the extreme south may prefer a moderate altitude in the far north. Similarly a preference for a southerly aspect in the north may change to a preference for a northerly aspect in the south.

Altitude: The upper limit of effective tree growth in New Zealand is between 2000ft. and 2500ft. Most species prefer moderate altitudes, but the exceptions include larch, spruce (provided the atmosphere is moist), and *Pinus murrayana*, all of which are high country trees.

Redwood (diameter 27in. and height 80ft. at 24 years of age) near Taumarunui on light soil. A house was built from a nearby stand 29 years old.

Topography and aspect: Some species are at home on flat country (for example, macrocarpa, ash, willows), but most of them prefer sloping ground, especially larch. Some like a southerly aspect (for example, Douglas fir and larch), but others do best on a northerly one (for example, most pines).

Soil: Since most of the constituents of wood come from the air and not from the soil, it follows that for trees the richness of a soil is not as important as its physical condition. Acidity or alkalinity, good or poor drainage, soil texture, and the presence of a hard pan considerably affect the choice of species. No trees will flourish where drainage is poor or there is a hard pan, but some are more tolerant of these conditions than are others. Poplars, willows, and alders will succeed on moist soils, though poplars will not grow on peat; cedars and *Casuarina* will tolerate dry sites; a few intolerant species, for example, ash, oak, and redwood, demand good, well-drained soils.

Climate: Climatic factors can influence the choice of species, but are of concern only if they are abnormal or if an intolerant species is being considered. For instance, most of the pines are badly damaged where snowfalls are heavy, whereas larch, spruce, and Douglas fir are little damaged. A few species (such as spruce and larch) seem to require a hard winter for really healthy growth. Many species are sensitive when young, requiring some shade or shelter for successful establishment, but are quite hardy later. Average annual rainfall below 30in. imposes further restrictions on the choice of species. Salt-laden winds are harmful to most species, but macrocarpa and radiata pine among the conifers and *E. botryoides* among the eucalypts are less likely to damage by such winds than are other species.

Vegetative cover: Where scrub growth is vigorous a fast-growing species (radiata pine or some of the eucalypts) should be chosen and large planting stock used. Slow-growing trees and the use of small stock in areas where scrub growth is vigorous will mean years of opening up of lines to prevent the trees from being overtopped.

The choice of species is the only part of establishing a woodlot that may require more experience and knowledge than the average farmer already has. If there is any doubt as to the best species to grow, it is desirable to discuss the problem with the nearest Instructor in Agriculture or District Forest Ranger.

Species Most Often Used

The following species are those most often used in woodlots in New Zealand:—

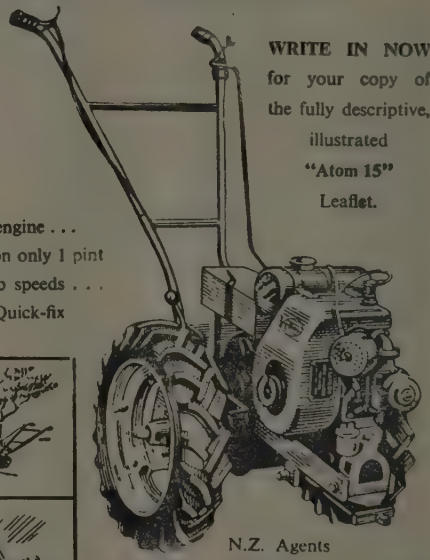
Californian big tree (*Sequoia gigantea*): It is suitable for moist, low-lying

BARFORD MULTI-PURPOSE TRACTOR

Atom 15

Works 10 ways for you!

1.9 h.p. Petrol engine . . . Fuel consumption only 1 pint per hour . . . Two speeds . . . Huge range of Quick-fix implements.



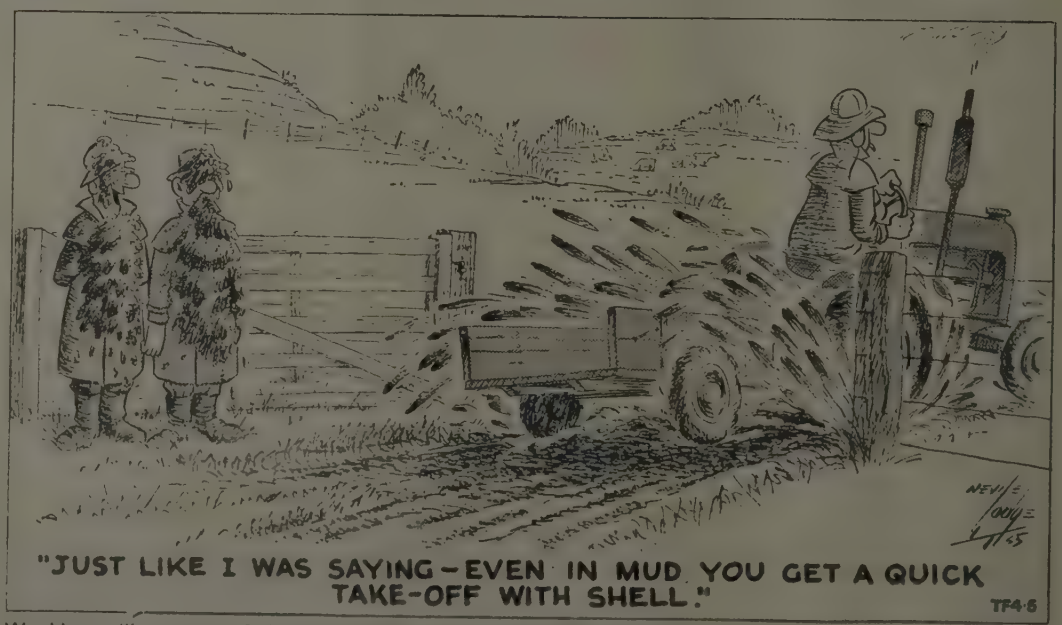
WRITE IN NOW for your copy of the fully descriptive, illustrated **"Atom 15"** Leaflet.

N.Z. Agents

BOOTH MACDONALD

AND CO. LTD.

P.O. Box 99 Christchurch



"JUST LIKE I WAS SAYING—EVEN IN MUD YOU GET A QUICK TAKE-OFF WITH SHELL."

TF4-6

Would you like a copy of this cartoon? Write to Advertising Division/4 The Shell Company, Box 2091, Wellington.

Larch at Wanaka Station. This species prefers southerly faces as long as they are not too exposed.

sites; trees grow large and have a pronounced taper unless grown in fairly dense groups; the timber is soft and brittle, but heartwood can be used for weatherboards and sash timber.

Cedars (*Cedrus* spp.): These species are suitable for drier sites. Trees are slow growing and prefer some initial shelter. The timber has durable heartwood and is good general-purpose timber in its native countries, but is not yet well known in New Zealand.

Corsican pine (*Pinus laricio*): This pine shows a wide tolerance of latitude, altitude, and site in New Zealand; it has been grown successfully from North Auckland to Southland and is perhaps at its best at Hanmer Springs. It is slower growing than most pines, with a rotation of 60 to 80 years. The timber is denser than radiata pine and is suitable for flooring and general building, but requires preservative treatment against decay and anti-sapstain dip to avoid discoloration during seasoning.

Cryptomeria (*Cryptomeria japonica*): This tree has been known as Japanese cedar. It makes a very slow start in the open, being more suitable for under-planting cut-over bush or under open-grown exotics; 2-year stock should be planted. Its timber is valuable in Japan, but little is known about it as yet in New Zealand.

Douglas fir (*Pseudotsuga taxifolia*): The timber-trade name is Oregon pine. It has done well on pumice plains near Rotorua and on foothill country south of there, including the South Island. It is not successful in Auckland Province or on any hot, dry areas; the tree is semi-light-demanding, requiring fairly early thinning if planted close (6ft. x 6ft.). The dense shade cast when a canopy is closed suppresses weed growth quickly. The tree prefers southerly faces with fairly deep, well-drained soil (moister than for larch). Its rotation is 60 to 70 years. Trees are extremely prone to damage by opossums, deer, and other animals. The timber is used for sawn framing, weatherboards, etc. The heartwood is fairly durable above ground and thinnings when creosoted are suitable as natural round poles.

Eucalypts: Many varieties of eucalypts have been tried in New Zealand and some have proved to be rapid growers, producing more durable timber than is usual with fast-growing trees. The better-known eucalypts and the approximate temperatures they will endure are:—

E. botryoides (mild)	*E. muelleriana* (mild)
E. eugenioides (mild)	*E. obliqua* (cool)
E. fastigata (mild)	*E. pilularis* (warm)
E. gigantea (cool)	*E. regnans* (cool)
E. grandis (warm)	*E. saligna* (mild)
E. macarthuri (cool)	*E. sieberiana* (cool)
E. maculata (warm)	*E. tereticornis* (mild)
E. maideni (cool)	*E. viminalis* (cool)

Some species have given trouble in transplanting and it has been necessary to use seedlings whose roots have been enclosed in a plug of soil inside a cylinder of 3-ply or to plant from trays so that cubes of soil from the tray enclose the roots of transplanted seedlings. Difficulty due to splitting of logs and to warping and collapse of timber in seasoning has been experienced, though success has usually followed a method of slow seasoning by block stacking, if necessary under shade.

Larch (*Larix decidua*): This is a cold-country tree from northern Europe and Asia; it tolerates a variety of soils, provided they are fairly deep and well drained. The species is no good on flats and wet slopes; it prefers southerly faces as long as they are not too exposed. The tree is a light demander and will not tolerate shade, so that when trees are planted close (say 6ft. x 6ft.) early thinnings will be necessary. It is deciduous and does not smother weed growth well and it is slow growing, requiring 60 to 80 years to reach good millable size. The tree is not very inflammable. Heartwood is tough and moderately durable. Sawn timber is used for house framing and flooring and for general farm purposes; thinnings are useful as farm rails. Two-year stock should be planted.

Lawson's cypress (*Chamaecyparis lawsoniana*): The timber-trade name is Port Orford cedar. It is an excellent shelter tree where it can be grown free of disease. Cypress canker or gummosis disease is common in the Waikato and parts of the Wairarapa and has been reported from other parts

Hedge of Lawson's cypress 13 years old in a Hastings orchard. Trees were planted 2ft. apart and had not been topped.

of New Zealand. Lawsoniana definitely should not be planted where there is a chance of trees having "wet feet". This tree is fairly slow growing and needs some initial shelter. Cultivation of the ground before planting will help establishment considerably, and 2-year stock should be used. The heartwood is durable and of considerable value in the U.S.A., but heartwood forms slowly in New Zealand-grown trees.

Macrocarpa (*Cupressus macrocarpa*): This tree has wide site tolerance, provided the site is not dry and shallow or waterlogged. Like other cypresses it is susceptible to cypress canker or gummosis disease. Macrocarpa is a useful farm tree which when grown in the open has a wide spreading habit, but in a plantation is tall and lightly branched. The species is good for coastal sands, as it tolerates salt winds better than do other trees. The tree has a medium rate of growth, maturing in about 50 to 60 years. It is shade tolerant to a limited extent. As macrocarpa tends to be difficult to transplant, 2-year stock with well-developed roots should be used in most localities. It produces fairly strong, general-purpose timber and durable heartwood suitable for joinery where grade is good enough and useful for fence posts.

Maritime pine (*Pinus pinaster*): This is the coastal pine of south-western Europe; in New Zealand it is a healthy tree on sand dunes or on high country, but its form has not been attractive. However, if care is taken as to the type of tree grown, it still has its value in difficult places, especially in erosion control.

Muricata pine (*Pinus muricata*): This species has been known as Bishops or prickly cone pine; there are two distinct types, a poor green one and a good bluish-green type. *P. muricata* was once strongly recommended for difficult sites, but most trees grown were of the poor type, which apart from its shelter value produces nothing but firewood; the blue type, where it is obtainable, is still recommended.

Ponderosa pine (*Pinus ponderosa*): There are several types in New Zealand and the variety *scopulorum* should be avoided. From the middle of the North Island southward the growth-rate of *P. ponderosa* is medium; in the north it has been a failure. A special feature is that it will endure frosty sites and much colder winter temperatures than will other pines. The timber is similar to radiata pine, but wood from the centre of logs is prone to warp.

Poplars (*Populus* spp.): Poplars are fast growing and generally are able to survive moist conditions, provided the soil is not peaty. They grow quite well in dry sites, provided the soil is deep. The Lombardy poplar is an excellent shelter tree for orchards and gardens, but its timber value is lower than that of the other species. The timber is tough and light, but not durable. It is suitable for gates, rails, battens, and dray floor boards.

Radiata pine (*Pinus radiata*): This species, which has been known as insignis pine and Monterey pine, is the most popular species throughout New Zealand. It has succeeded everywhere except in Northland and tolerates a wide range of soils from sand to rotten rock. Trees are easy to establish and grow quickly, with a rotation of 40 to 50 years, though millable size may be reached at a much younger age. As trees are very light demanding, early thinning is necessary if they are planted 6ft. x 6ft. Trees at this spacing suppress weeds very well and rapidly. Yearling trees can be planted in clean country, but 2-year trees should be used where weed competition is serious. Trees are subject to windthrow in shallow soils and to top breakage in deep soils in windy sites. They are damaged also by snow and rabbits, hares, and other pests. The timber is easily worked and if properly graded and seasoned, can be used for house construction; sapwood is not durable unless preserved.

Redwood (*Sequoia sempervirens*): This species does not tolerate unsuitable conditions. It requires good moist soil and shelter in the early stages (cut-over bush in a valley is a good site) and it can be established under larch or poplar. The tree is very attractive to opossums, which cause double leaders by biting off the original leader. The timber is soft and rather brittle, but the heartwood is suitable for joinery work and weatherboarding if its grade is satisfactory.

Robinia or false acacia (*Robinia pseudacacia*): This is a good tree, because it supplies very durable posts in the shortest possible time (about 15 years); it is very tolerant as to site and can endure low temperatures. It produces many suckers, but these may be kept in check by browsing stock.

Southern pines (*Pinus caribaea, P. patula,* and *P. taeda*): These are suitable for planting in the north of the North Island where other pines are unthrifty, but as these species must be very carefully sited, the nearest forest officer should be consulted. Growth-rate on suitable sites is medium; the rotation is 50 to 60 years.

Spruces (*Picea* spp.): These are suitable for high altitude sites where atmospheric moisture is high; on the plains and drier sites these trees are affected by aphides (*Chermes*). The timber is tough and white, but not durable unless treated.

Western red cedar (*Thuja plicata*): This is a somewhat fastidious tree which produces a valuable lightweight, durable timber. It requires a fairly fertile soil and some initial shelter; even then it is slower starting than most of the other species listed.

Possibilities of Pampas Grass on Coastal Sand in Wellington Province

By W. A. JACQUES, Senior Lecturer in Field Husbandry, Massey Agricultural College

A LIMITED survey of sand dune country on the west coast of Wellington Province and in one part of Taranaki has shown that pampas grass has possibilities for certain situations on stabilised sand; on unstabilised sand growing of it is warranted only if there is sufficient shelter or local stability to ensure early establishment and vigorous and even growth. Pampas grass satisfactorily established on sand country will provide a very valuable reserve of feed for cows for both winter and summer.

THE sand dune country in the North Island is extensive and particularly so along the west coast of the Wellington Province. A region of sand ranging from raw, unconsolidated, moving sand to more or less stabilised and scrub-covered areas extends from Paekakariki in the south in an almost unbroken line for 100 miles along the coast to Patea in the north. This strip of sand extends inland to an average depth of about 4 to 5 miles, the maximum depth being about 12 miles. The distribution of the sand dune country is as follows:—

	Acres
Paekakariki to Manawatu Heads	60,000
Manawatu Heads to Himatangi Beach	70,000
Rangitikei Heads to Whangaehu River	100,000
Whangaehu River to Patea	50,000
	280,000

This block of 280,000 acres is the largest and most compact area of sand dune country in New Zealand.

Unstable Area

There is an unstable area consisting in the main of the foredune, the unstable and often mobile strip up to ½ mile wide immediately behind the foredune, and an area extending a further ½ mile or so inland from this. This last strip may be reasonably well held with lupins, bracken fern, mariscus, toetoe, and manuka, but could readily become mobile again if the cover was interfered with in any way. The extent of this unstable area is about 64,000 acres; none of it is stable enough or mature enough for immediate farming. Extensive tree planting could profitably be undertaken here, as it has been at Waitarere and Flock House, to maintain soil stability, provide timber, and at the same time afford wind protection to the land further in from the sea.

Stabilised Area

The stabilised farmable sand country inland from the proposed coastal tree belt consists mainly of stabilised dunes, some relatively unstable dunes, and tongues of dunes moving inland from the coastal belt. In addition there are dry sand plains, wet plains, peat swamps, and lakes interspersed among the dunes. This consolidated and more

HEADING PHOTOGRAPH: An old-established stand of pampas grass on stabilised sand at Ohau, showing 6 months' growth. The area in the foreground had just been summer grazed (January).

Scientific proof that Phenzeen Plus gives Maximum Kill

Scientific tests were recently carried out by the Commonwealth Scientific and Industrial Research Organisation in Australia to determine how fine the phenothiazine particles must be for greatest effect.

Elliotts Fine Particle Phenothiazine, as used in Phenzeen Plus, was proved to have the correct sized particles necessary for MAXIMUM KILL.

Elliotts manufacture their own raw material and are thus always able to ensure fine particle phenothiazine of correct particle size for maximum effectiveness.

Elliotts were the Pioneers of Liquid Phenothiazine Drenching

Elliotts NEW GREEN BAND

PHENZEEN PLUS

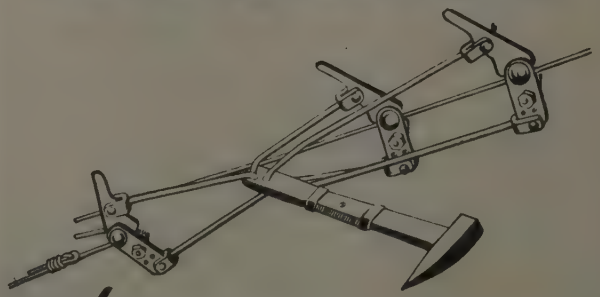
WITH

CORRECT PARTICLE SIZE PHENOTHIAZINE

MANUFACTURED IN NEW ZEALAND BY ELLIOTTS N.Z. COMPANY: ELLCO LTD., AUCKLAND.

11.4C

DONALDS



New WIRE-STRAINER

36/-

DELIVERED FREE

THE WORLD'S BEST WIRE-STRAINER

No other wire-strainer has all these features:

- New all-steel grips.
- New combination staple puller, hammer, file and key.
- A complete fence repair outfit.
- Takes up an unlimited amount of wire without removal.
- Indispensable for guiding trees when being felled, hauling logs, pulling animals or cars out of ditches, etc.
- Over 20,000 sold last year in New Zealand, Australia, South Africa and Great Britain.
- Guaranteed against defect or breakage.

Obtainable from all stores or from

DONALD & SONS LTD.

BOX 138, MASTERTON, N.Z.

Wind has begun to remove sand from round the roots of this pampas grass. Plants that are seriously undermined fail to survive.

mature sand country forms a roughly triangular belt of up to 10 miles deep, tapering off to narrow strips at the northern and southern extremities. The total area of this type of country is estimated to be about 216,000 acres, most of which is privately owned.

Two major problems of this region centre round the wet, low-lying areas and the high, relatively unstable sand ridges. The low-lying areas are frequently too wet in winter for effective utilisation, and breaks occurring on the sand ridges endanger the vegetation on the surrounding country as the sand begins to blow.

Pampas Grass Survey

During 1953 a limited survey was made of pampas grass stands in this region of sand country and also at Pihama in Taranaki to determine if pampas grass was of any value in stabilising the sand and its usefulness when established. On a Pihama farm of 112 acres where half the area was raw sand 4000 pampas grass plants had been planted in reasonably flat areas in the lupins not more than ¼ mile from high tide mark. The hills were not planted but left in lupins. In this area, where blown sand is less abundant than in the sand country further south, the establishment of the plants created no problems. When the pampas grass was planted there was reasonable stability and little loose sand was being blown about and growth following establishment was rapid.

The usefulness of the pampas grass in this instance, however, was negatived largely by poor utilisation and bad fencing. Lupin growth in the pampas grass was controlled with the slasher until 1953, when a hormone spray was used effectively on the lupins. With better stock control this area could have been a valuable source of winter feed and shelter for young and fattening cattle, particularly where (as in this case) silage was fed out to stock in the pampas grass area. It has been determined in practice that these two feeds are complementary, as the silage with its laxative tendency counters the non-laxative pampas grass. Here, as elsewhere, pampas grass has demonstrated its ability to grow on sand near the sea provided there is some shelter and the sand is reasonably stable.

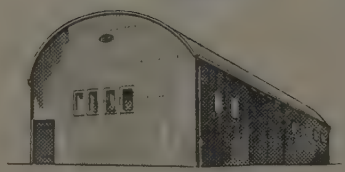
On a Patea farm 5000 pampas grass plants were put out between 1948 and 1951. By the summer of 1953 only a light feeding of the earliest-planted pampas grass had been permitted (in the summer of 1952) and the farmer reports that the cows did not relish their first grazing. The pampas grass was planted in loose sand at the same time as marram grass and without receiving any special treatment. The sand was very uneven. Some of the plants have grown well and quickly; others have made practically no growth, and even after from 2 to 5 years some plants have developed only 2 or 3 tillers. Poor plants that start away slowly and take a long time to make up the leeway of a bad start can be found in most plantations. Under the more difficult conditions of establishment evident here the number of plants was greater and the recovery rate slower than on better land where more care was taken in planting. The pampas grass stands were again not more than ¼ mile from the high water mark and were subject to very strong winds from the sea.

At Wanganui two areas of pampas grass were observed growing on sand. The first of these was planted in 1939 near a farmstead on well-stabilised sand and not on the dune area proper. Before it was planted the area was in

For farm buildings, warehouses, workshops, garages and factories. Extremely flexible capacity . . . Can be supplied in 12ft. to 30ft. spans . . . Any length from 30ft. in multiples of 15ft. Door and window openings can be located where required.

Ask your local branch of the Loan & Mercantile Company for full details.

* PREFABRICATED
* ALL STEEL
* LOW COST
* QUICKLY ERECTED!



SMISTOL

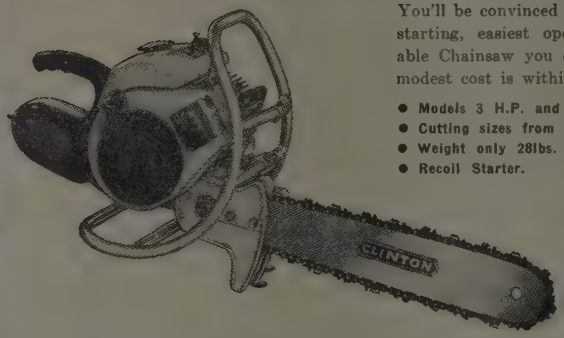
ALL PURPOSE * BUILDINGS

N.Z. LOAN & MERCANTILE AGENCY CO. LIMITED.

Incorporated in England.

Branches throughout N.Z.

CLINTON CHAINSAW



You'll be convinced here's the quickest starting, easiest operating, most reliable Chainsaw you can buy. Clinton's modest cost is within reach of anyone.

- Models 3 H.P. and 5 H.P.
- Cutting sizes from 14" to 42".
- Weight only 28lbs.
- Recoil Starter.

CLINTON CHAINSAW DEALERS:

NORTHLAND: N.Z. Loan & Mercantile Agency Co. Ltd. AUCKLAND: Farmers' Trading Co. Ltd., Broadway Motors Ltd. PAPAKURA: O'Shannessey & Chadwick Ltd. THAMES: Dalgety & Co. MATAMATA: Matamata Machinery Exchange. ROTORUA: G. E. Gilltrap. WHAKATANE: Cutler Bros. TE KUITI: N.Z. Loan & Mercantile Agency Co. Ltd. TAUMARUNUI: Manawui Motors. PALMERSTON NORTH: Field Machinery Ltd. WANGANUI: Wright, Stephenson & Co. Ltd. TAURANGA: N.Z. Loan & Mercantile Agency Co. Ltd. OTOROHANGA: G. G. Sanders Ltd.

N.Z. Factory Representatives:

AGRICULTURAL CULTIVATORS (N.Z.) LTD., P.O. Box 1102, Auckland 3/5

Since **1872**

The many branches of the National Bank throughout New Zealand have offered a service of experienced financial Counsel to farmer customers.

THE

NATIONAL BANK

OF NEW ZEALAND

LIMITED

134 Branches and Agencies throughout New Zealand.

Here sand has practically buried a number of plants. Provided some leaves remain above ground, pampas grass is able to survive and adjust itself to the new sand level.

grass, which was very liable to suffer from drought in summer, but the pampas grass has been a marked success and has withstood very dry conditions extremely well.

The second area, consisting of 3000 plants, was planted in 1948. The sand at the time of planting was raw, unconsolidated, and very liable to blow. This area after 4½ years' growth has given a disappointing yield. Here again the variable growth of plants noted at Patea was apparent; some plants had still not developed more than 3 or 4 tillers. This area is now fully stabilised; stabilisation has been achieved partly by the pampas grass and partly by the invading lupin, which has been kept under control by annual treatment with a hormone spray. So far no grazing has been taken from this pampas grass stand, but it has now reached the stage where it can be fed off lightly. The farmer and the farm manager of this property are satisfied that the planting has been worth while. There is no doubt that this is a difficult area on which to establish pampas grass and it is surprising that the crop has done as well as it has.

On a farm at Ohau 6000 plants were put in between 1942 and 1944. Here again the pampas grass areas can be divided into those on stabilised sand and those on raw, unconsolidated sand.

On the stabilised areas the pampas grass was extremely well and evenly grown and appeared to be highly productive. Despite the very heavy summer rainfall of 1953, the pastures in the adjoining fields were poor and unproductive and gave virtually no feed. The pampas grass on the other hand, though lacking the deep green colour associated with plants grown on heavier and richer soils, was growing vigorously (see illustration on page 599).

The planting that had been made on an unstabilised sandhill had effected a good degree of stabilisation. Stock had access to this area and grazing did not induce sand movement. The farmer was careful, however, to see that there was no overgrazing, as otherwise there may have been movement of sand. This area was further from the sea than those mentioned previously and was surrounded by sand fixed with lupins, which eased the problem of stabilising the dune with pampas grass. Growth on this area was good and was being used with pasture as the feed supply determined. This was the most productive of the pampas grass stands on the unconsolidated sand.

At Waikanae two areas had been planted on partly stabilised dunes and established well. On one of them all the plants that had a reasonable amount of shelter from the worst of the gales were growing well. Where exposure was extreme there was a tendency for wind funnels to form between the plants and for sand to be blown away from the roots. Where the roots were exposed in this way the plants were unable to survive (see illustration on page 601).

The second area at Waikanae was on an unstable dune. The pampas grass had become well established, but subsequently the western face had been undermined by strong winds, the sand blown elsewhere, and many of the plants killed. On the part of the dune where sand was accumulating the plants were thriving and growing up through the sand (see illustration above). The dune has begun to move, however, and it is very unlikely that any of the plants will survive.

Use of Pampas Grass on Sand

Unstable area: Pampas grass can be grown satisfactorily in this belt of sand country provided there is some shelter from the worst of the storms and provided sand is not being blown away from the roots.

There is no doubt that on selected sites in what has previously been referred to as the unstable area pampas grass can be grown successfully. It would appear questionable, however, whether this is wise in view of the irregularity of growth and the time that must elapse before the stand is ready for grazing. As a sand-binding

crop it is expensive and less efficient than marram grass and lupins. Furthermore, on the drier parts of the dunes it is possible that drought would cause a reduction in both growth and palatability during dry summers. For plants to be drought resistant the roots must be able to reach a depth in the sand where water is readily obtainable. The root system of pampas grass has been traced down to 10ft. 6in. in a silt loam, but this depth of root may not be sufficient to prevent drought damage on the dunes proper. There would appear to be no moisture problem on the drier plains between the dunes, where the water-table though too low for satisfactory pasture grass growth, is not necessarily so for the deeper rooting pampas grass.

Where pampas grass has been established on dunes it provides a good break for winds. The danger lies, however, in the regions where plants have failed to establish and wind funnels are created. Here sand can be blown away from the roots and cause not only the death of the affected plants but a break in the cover, causing a change in the shape of the dune. Wherever there is a steady and not too heavy accretion of sand pampas grass will grow through it and thrive, helping to bind the sand at the same time. One such plant at Wanganui which is reported to be not less than 30 years old has persisted on the leeward side of a wandering dune and is estimated to have raised itself fully 30ft. in the period.

Stabilised sand areas: Where the sand is stable there is no difficulty in establishing and maintaining pampas grass. It forms a very valuable reserve of forage for both winter and summer. It is less affected by drought than ordinary grass or even lucerne, and there appears to be no record of its having been killed by drought. Drought usually affects the plants at a time when they are flowering or preparing to flower. The first effects of drought are most apparent on the flower heads and the observed external effects of drought are as follows: One of the lower internodes on each of the affected flowering stems shrinks and blocks the upward movement of sap to the flower head. The leaves that are situated above the affected internode on the stem turn brown and die and the flower stalk ceases to elongate. If this condition is maintained for some time, the head becomes incapable of further growth, but if the water supply is renewed before material damage is done to the flower head, delayed flowering may proceed. The leaves on the non-flowering shoots progressively lose their greenness and apparently become more fibrous and possibly less palatable. Loss of colour is apparent first at the leaf tips and then extends down.

Conclusion

It appears, therefore, that pampas grass has a place on the stabilised dairying land to leeward of the foredune and the unstable area, where it can be regarded as a reliable producer of summer and/or winter forage. When well managed it is highly productive; in fact some of the most productive stands in New Zealand are on this class of land. It is possible (judging by the colour of the leaves) that nitrogen applications could assist the growth materially or that red clover established between the plants could provide both nitrogen for the pampas grass and some feed for stock.

The growing of pampas grass in the unstable sand area is warranted only where there is sufficient shelter or local stability to ensure early establishment and vigorous and even growth. Though pampas grass can tolerate moderate amounts of sand blowing on to it, it cannot tolerate sand being blown away from the roots. Sand accretion may build up a dune round the plants. The higher this dune becomes the greater is the danger of a break occurring which will destroy the stand. For a pampas grass stand to be satisfactory in this region the surrounding sand must be well fixed with lupins or other sand plants. Planting on loose sand without surrounding protection is most unsatisfactory and fixation should first be undertaken with marram grass and/or lupins.

The farmer on this land who plants pampas grass must be prepared to control the growth of lupins in the pampas grass area. The lupins provide protection from wind and prevent the removal of sand, but they grow so quickly and spread so rapidly that control of them is essential if the pampas grass is to survive. Without such control the lupins may form a mass of growth which is almost impassable to stock and in consequence there is poor utilisation of the pampas grass.

Reference

Report of Research and Afforestation Committee, Pub. No. 1, Manawatu Catchment Board.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given during July as follows:—

1YZ Rotorua, 7.15 p.m.

7 July—"Seasonal Work for the Dairy Farmer", by S. R. Hewitt, Instructor in Agriculture, Department of Agriculture, Whakatane.

21 July—"Shepherding at Lambing Time", by A. G. W. Stevens, Livestock Instructor, Department of Agriculture, Rotorua.

27 July—"Diet and Comfort of Young Pigs", by S. W. Rees, Supervisor, Bay of Plenty District Pig Council.

2XA Wanganui, 8 p.m.

7 July—"For the Countrywoman", by Mary MacDonald.

14 July—"The Radio Vet.", by S. Jamieson, Veterinarian, Department of Agriculture, Wanganui.

21 July—"Care and Attention to Pigs during Winter", by C. M. Baillie, Supervisor, Taranaki District Pig Council.

28 July—"How to Purchase Farm Seeds", by G. R. Moss, Fields Instructor, Department of Agriculture, Wanganui.

3YA Christchurch

11 July (12.20 p.m.)—"Seasonal Orchard Work", by J. Coombe, Horticultural Instructor, Department of Agriculture, Christchurch.

28 July (7.15 p.m.)—"Stone Fruit Growing", by J. Coombe, Horticultural Instructor, Department of Agriculture, Christchurch, and Mr. L. Stow, orchardist.

4YA Dunedin, 9.15 p.m.

4 July—"High Country Pasture Investigations", by J. M. Hercus, Instructor in Agriculture, Department of Agriculture, Alexandra.

11 July—"Blast Disease of Stone Fruits", by D. W. Wilson, Horticultural Instructor, Department of Agriculture, Roxburgh, and orchardist.

18 July—"Protective Inoculation of Sheep", by J. A. Milne, Veterinarian, Department of Agriculture, Dunedin.

25 July—"Sheep Feeding", by J. G. Richards, Instructor in Agriculture, Balclutha, and I. M. Cairney, Veterinarian, Dunedin, both of the Department of Agriculture.

4YZ Invercargill, 7 p.m.

5 July—"Hoggets", by R. Buchan, Livestock Instructor, Department of Agriculture, Gore.

12 and 19 July—"Pre-lambing Shearing", by W. Dick, Sheep and Wool Instructor, Department of Agriculture, Invercargill.

26 July—"Breeding Problems", by J. P. Anderson, Veterinarian, Department of Agriculture, Invercargill. "Agricultural Experiments in Eastern Southland", by T. Sewell, Instructor in Agriculture, Department of Agriculture, Gore.

Regular Sessions

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8.5 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, 7.45 p.m., and Saturdays at 6 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month), Thursdays at 12.33 p.m. and 7.15 p.m. (fortnightly).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m. Thursdays at 12.33 p.m., Fridays at 7 p.m.

2YZ Napier, Tuesdays at 12.12 p.m. (Hawkes Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawkes Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Wednesdays at 7 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m. Tuesdays at 7 p.m.

Use of Lucerne for Grazing in Maniatoto County

By W. A. LUNN, Fields Instructor, Department of Agriculture, Dunedin

LUCERNE has generally been regarded as being more useful for hay production than for grazing. This article discusses its place as a grazing proposition in the low-rainfall areas of Maniatoto County and its establishment in combination with grasses and its subsequent management.

THERE are many thousands of acres in the South Island where rainfall is inadequate for the maintenance of high-producing pastures. On these areas the alternative is to sow species which will suit the conditions. For this reason many farmers in Maniatoto County have sown lucerne for both grazing and hay. Some now have more than 600 acres sown in lucerne and there are numerous farms where 100 to 300 acres have been sown and are grazed regularly.

The lucerne growing country of the Maniatoto is 1200ft. to 1500ft. above sea level and has a rainfall of from 13in. to 17in. a year. Winters are cold with heavy frosts, and snowfalls in July and August are likely. In summer hot north-west winds cause high evaporation losses.

The most critical time in the life of a lucerne stand is at establishment, and as thickening up or increasing plant numbers from reseeding or oversowing is not satisfactory, careful attention at sowing time is essential.

Seed-bed preparation should be thorough, as sufficient moisture must be available to strike and establish the seedlings, which must be sown at a shallow depth on a firm seed-bed. The ground should be well fallowed and cultivated to conserve moisture and to kill weeds and then finally prepared by harrowing and rolling until the surface is firm. Inoculated seed is sown on a rolled seed-bed either by being drilled lightly or by being broadcast and then covered by brush harrows or light tine harrows on their backs. A heavy chain or even scrubby bushes tied to the drawbar will cover the seed sufficiently.

Time of Sowing

Good results are obtained in Maniatoto County from December-January sowings, as rainfall is usually adequate at some time during these months to give the young plants a good start. Sowing may be made in early spring to take advantage of the moist soil conditions to establish plants before the dry, windy period sets in, but severe competition from weeds is always a risk with spring sowings.

With December-January sowings the young plants can usually carry on through February and on to cooler autumn weather and be well enough established to withstand frosts. If sowings cannot be made during December or January, it is advisable to wait until early March to take advantage of cooler weather and a better chance of rains for quick establishment.

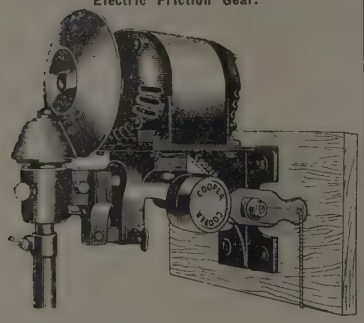
Root development is important and a young lucerne plant will usually develop far more root than top growth in dry weather or in cooler autumn weather. This quick, deep-rooting system enables lucerne to withstand fairly severe extremes of temperature once it has struck and grown for a short time.

This characteristic is well demonstrated by the following method of establishment, which has been found

HEADING PHOTOGRAPH: Grazing lucerne on unirrigated land near Patearoa under a yearly rainfall of 16in.

COOPER SHEEP SHEARING EQUIPMENT

Cooper Horizontal Type
Electric Friction Gear.



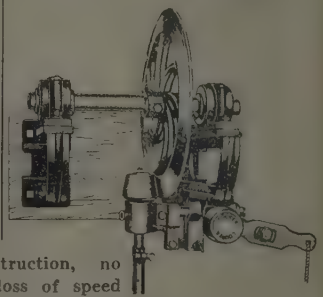
This popular Cooper model is offered to the farmer with improvements. High grade, ½ h.p. motor. Single and three phase. Designed to give long service. Special electric grinders.

Cooper 1 STAND PORTABLE MACHINE

Powered with a 1 h.p. Villiers engine and complete with grinder.

Fully illustrated pamphlet on request

Cooper Friction Gear
The "Leader" Shafting Model.



Strong construction, no slippage or loss of speed or power. Trouble-free efficiency. Ball-bearings at all necessary points. Single or Double-ended ball-bearing grinders.

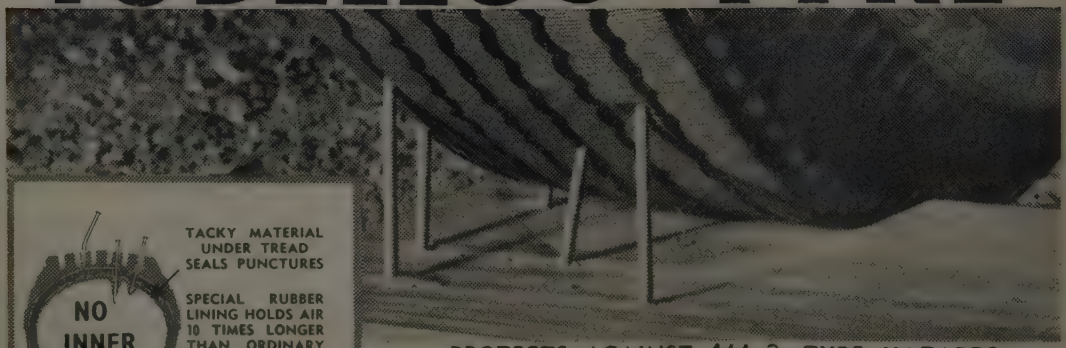
THE COOPER ENGINEERING CO. (N.Z.) LTD., BOX 599, AUCKLAND.

DISTRIBUTORS THROUGHOUT N.Z. WRITE FOR THE NAME OF YOUR LOCAL AGENT

Reidrubber

NOW MANUFACTURE THE WORLD-FAMOUS B.F.Goodrich LIFE-SAVER

TUBELESS TYRE


NO INNER TUBE
TACKY MATERIAL UNDER TREAD SEALS PUNCTURES
SPECIAL RUBBER LINING HOLDS AIR 10 TIMES LONGER THAN ORDINARY TUBES
PRESSURE SEALING RIDGES PREVENT AIR LOSS AT RIM

PROTECTS AGAINST *ALL* 3 TYRE HAZARDS

SEALS ITS OWN *PUNCTURES* — PROTECTS AGAINST *BLOWOUTS* — GUARDS AGAINST *SKIDS*

FITS PRESENT RIM — NOTHING EXTRA TO BUY

MADE IN NEW ZEALAND BY REIDRUBBER LS 18.1

to be satisfactory on some Maniatoto farms: Soft turnips are sown with the lucerne at 8oz. to 10oz. per acre and provide good winter feed. The resultant stock trampling assists establishment and there is an appreciable build-up in fertility from the heavy stocking. When the turnips are finished and before the lucerne begins growth in spring a paddock sown in this way does not look very promising, but subsequent growth is good.

Lucerne in Pasture Mixtures

Though most lucerne in the Maniatoto is sown alone, it may also take the place of other legumes in pasture mixtures on some properties and the sowing of lucerne and grass is in keeping with the proven method of stimulating grass growth through nitrogen provided by a legume.

Mixtures at present being used in Maniatoto County are:—

1. Lucerne, 10lb., and cocksfoot, 3lb. per acre, drilled as a mixture.

2. Lucerne, 10lb., and cocksfoot, 3lb. per acre, sown in alternate rows at 7in. intervals.

3. Lucerne, 10lb., subterranean clover, 3lb., and *Phalaris tuberosa*, 5lb. per acre. This mixture was sown on one property in the autumn of 1953 and has provided excellent feed for both sheep and cattle.

4. Lucerne, 8lb., subterranean clover, 3lb., and cocksfoot, 4lb. per acre.

Cultivation

There are two schools of thought on lucerne cultivation, and though there are undoubtedly many good stands which have never been cultivated, old stands can often be rejuvenated by cultivation.

A lucerne stand becomes consolidated rapidly on the surface after several years of mowing, side-raking, and carting off bales three or four times in a year. Grazing tends to seal the surface and causes moisture to run off into hollows rather than allow it to soak into the ground round the roots, where it is most needed. Fertilisers and lime are not as quickly available if they are spread on to a hard-packed soil surface.

Cultivation should be done in the dormant season, when young shoots cannot be damaged. A spring-tined cultivator is a good implement for the job, as the tines tend to move between the plants. Narrow lucerne points can

Upper right—A rolled paddock suitable for the sowing of lucerne. Middle right—Young lucerne plants before spring growth has begun and after the turnips with which they were sown have been grazed off. Lower right—Good establishment of lucerne with turnips broadcast on a rolled surface in late December.

Unirrigated lucerne for hay (foreground) and for grazing (background) at Hyde.

be fitted to the cultivator to reduce the risk of damaging plants or of tearing up big lumps of earth which sometimes dry out and leave an uneven, bumpy surface. If the speed is kept down, the tines of the grubber or cultivator move round and over the tougher, well-rooted lucerne plants and dislodge the shallower-rooted grasses and weeds.

Many old grassy stands have improved in growth and yield as a result of being cultivated drastically.

Liming and Topdressing

Liming and topdressing requirements vary according to soil type, and lime or phosphate deficiency should be corrected before the stand is sown and should be maintained by periodical applications.

Lucerne has a high uptake of lime in comparison with grasses and other crops, and the following comparison of uptake in farm crops made by E. B. Davies of the Department of Agriculture's Soil Research Station, Rukuhia, shows the need for adequate liming of lucerne:—

LIME REMOVALS AS POUNDS OF CARBONATE OF LIME A YEAR

	lb. per acre
A wheat crop (32 bushels of grain per acre) ..	2
Clover hay (2 tons per acre)	125
Lucerne hay (4½ tons per acre)	350

The lime removal by lucerne under grazing would be much less, but there is still need for an adequate lime supply for lucerne growth.

Lucerne is not the pampered plant it was once thought to be, though naturally it does well on the best soils. Maniatoto experience has shown that under low-rainfall conditions it can be a very useful plant sown either alone for grazing or haying or as a legume with other dryland plants such as cocksfoot, phalaris, and subterranean clover on areas where ryegrass-white clover mixtures are limited by dry conditions.

Even in the hottest weather lucerne will retain some of its greenness and during dry spells makes ideal feed by supplying a good balance of greenfeed with a high proportion of dry matter on which stock will fatten and thrive.

Glasshouse Tomato Spacing Trials

By K. C. HOCKEY and E. BALL, Horticultural Department, Massey Agricultural College

SPACING trials were conducted in 1953 to try to arrive at some conclusions regarding the most satisfactory distances for tomato planting in glasshouses. The results were published in the October 1954 issue of "The New Zealand Journal of Agriculture". Briefly these results indicated that distances that gave an area per plant of 405 sq. in. produced slightly more fruit per unit area without affecting maturity dates than did distances giving 315 sq. in. per plant. The latter spacing was, before these trials, that normally used at Massey Agricultural College. It was decided to repeat the trials in 1954 to see if the same results were secured, and the production figures with dates of harvesting are recorded in this article.

The same glasshouse (a 100ft. x 30ft. house) was used and was divided into four equal parts as for the previous trial, two being at the normal spacing and two at the wider spacing. The areas were changed for the second trial, tomatoes at the wider spacing being planted on the areas where the closer spacing was previously employed. The total number of plants in the trials was 600 at the normal spacing and 447 at the wider spacing.

Harvesting records are set out in the right-hand column, the stage of picking in all instances being fully red.

The figures are for fruit actually sold and do not include a considerable quantity of green fruit still on the tops of the vines when they were removed.

Expressed in terms of pounds per plant, production was 7.6 for normal spacing and 11 for wider spacings. With plants at different densities such a method of comparing yield has no significance. A significant comparison would be where the yields are expressed in terms of pounds per square yard of glasshouse area. These figures are 27.2lb. for normal spacing and 29.7 for wider spacing.

The results in this trial substantiate those in the first trial and indicate that the weight of crop was in favour of the wider spacing and that the quantity harvested at any given time during the early part of the season was reasonably uniform.

In the light of these trials the college intends to make the wider plantings standard. This will reduce plant population by 25 per cent., and it is reasonable to suppose that there will be a similar reduction in certain costs. The items most likely to be affected are labour costs for work on individual plants and the cost of plants.

Picking dates	Quantity picked *Normal spacing	†Wider spacing
	lb.	lb.
October 6	16	23
11	46	53
13	31½	46
18	70	79
20	52	83
21	33	37
25	70	93
27	76	95
November 1	121	134
3	95	93
5	7	—
8	125	109
10	97	123
12	60	89
15	196	207
17	156	137
18	51	36
22	168	180
24	146	174
29	280	206
30	—	117
December 1	224	317
6	118	132
8	394	367
9	53	—
12	—	61
13	339	351
15	215	263
20	333	317
22	295	264
29	150	205
31	13	36
January 4	18	18
5	56	55
20	20	25
26	20	26
27	60	80
Totals	4,533½	4,929

* Normal spacings: Double rows 18in. apart with 27in. between the double rows and 14in. between the plants in the rows.

† Wider spacings: Double rows 18in. apart with 27in. between the double rows and 18in. between the plants in the rows.

Value of Cropping in the Auckland District

RECENT research work on the economic aspects of cropping and on comparisons of varieties of crops with ordinary grass silage for maintaining the milk supply on Auckland dairy farms in summer has shown the value of some crops, particularly certain varieties of turnips. In this article J. E. Bell, Fields Superintendent, Department of Agriculture, Auckland, discusses cropping practices and the value of the different varieties of crops.

WORK at the Department of Agriculture's Ruakura Animal Research Station showed that green lucerne was not better than and possibly not as good as grass silage, but that soft (white-fleshed) turnips were better to the slight extent of ½lb. of butterfat per cow per week. Since the turnips had a laxative effect and one of the cows scoured, and as some cows prefer turnips and others prefer silage, it is probable that a mixture of grass silage and turnips would have had better results. A similar margin was shown for chou moellier over grass silage at Massey College.

All or most of the work in preparing land and sowing a summer crop is done before the beginning of the busy silage harvesting period. Also with the use of an electric fence there is much less labour and expense in feeding crops than in cutting and carting out silage. There is less waste in the former method of feeding, particularly with turnip crops, than occurs in the majority of silage stacks.

Above—Dairy cows break feeding on chou moellier. With the use of an electric fence there is much less labour and expense in feeding crops than in cutting and carting out silage (below), and there is less waste than occurs in most silage stacks.

LUSTAR

is the PAINT which kills rust and preserves timber. This outstanding preparation which is EQUALLY BENEFICIAL to metals, timber, fabrics, ropes, asbestos-cement, etc., etc., also has a NATURAL AFFINITY for living tissue, and is therefore an ideal antiseptic dressing.

Particularly recommended for all Farmers and Orchardists . . . "LUSTAR"

Gals. 25/-; 4-gals. 80/-; drums £30 (in black only)

from
Your Stock Firm or Hardware Merchant.

Distributed by:
McGILL AGENCIES
BOX 1507, WGTN.

WARATAH

STEEL
FENCE POSTS
WE CAN NOW SUPPLY FARMERS DIRECT.

★

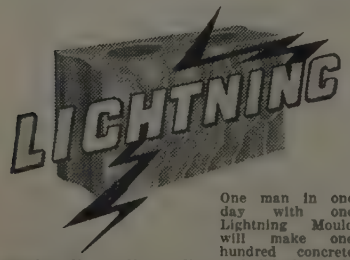
NEW APPROVED PRICE
4/6 EACH
F.O.B. OR F.O.R. MAIN N.Z. PORTS

★

For your needs write to:

RUSSELL & SOMERS LTD.

G.P.O. Box 194 Wellington
C.P.O. Box 1284 Auckland



One man in one day with one Lightning Mould will make one hundred concrete blocks 18in. x 8in. x 6in. to build those pig houses, sheds, etc.

Enquire from your Dairy Factory, Hardware Merchant or Stock and Station Agent for free illustrated pamphlet, or write direct to:

H. E. NAPIER LTD.
Box 1555, Wellington.

Lightning Fence Post Moulds also available.

STRUCSTEEL REGD. UTILITY SHEDS

FACTORY-MADE FARM BUILDINGS

YOU can have one up and in use in 7 days!

Send today for free illustrated literature.

"Strucsteel" Farm Buildings available in a large range of sizes for Hay Barns, Implement Sheds, Workshops, etc. Corrugated Galvanised Iron Walls if required.

L. J. FISHER & CO. LTD.,
P.O. BOX 1729, AUCKLAND.
Please send full details of Strucsteel Farm Buildings.

Name .....

Address .....

.....

.....

.....

JA/5.

"Strucsteel" Utility Sheds, as above, are available in lengths of 36ft., 54ft., 72ft., 90ft., etc., and widths of 18ft. Front height 11ft., rear height 9ft. 6in. Ideal for Fertiliser, Implement and general storage purposes.

N.Z. DISTRIBUTORS:—

L. J. FISHER & CO., LTD.

30 ANZAC AVENUE, AUCKLAND, C.1. PHONE 49-148.
116 HEREFORD ST., CHRISTCHURCH, P.O. BOX 1263, PHONE 69-994.

MOLACTRATE

PROTEINISED MOLASSES

BLOCK

Just put it out in the paddock . . .

Your Stock do the rest!

Reason for Cropping

However, these small differences may not in themselves warrant the expense and trouble of working up fields for crops and the main reason for cropping is in making use of ground lying fallow. On almost all farms throughout the country there are fields requiring renewal, and the best method of doing this is to plough and cultivate them so that the turf decays and the poor pasture species and weeds are destroyed. While this process is going on the land lies idle, when it probably could be growing a useful crop. The fields requiring renewal are usually in poor heart, but many will produce reasonable crops of turnips or swedes.

With autumn-saved grass, hay, and silage farmers can provide suitable fodder for winter. Established farmers supplying dairy factories no longer fear winter, but they do fear summer. Almost every summer over most of the Auckland Province there is a shortage of milk-producing, leafy pasture, and in one year in about five there is a drought when the feed shortage is most acute. The town milk supplier who has to milk his cows throughout the year is short of feed from January to September or October, more acutely so about April and again about August. The sheep farmer can do with feed to finish off tail-end lambs in summer and to flush his ewes. Almost every year extra feed of good quality is needed by all farmers in summer and autumn.

Crops for Dairy Cows

For summer feeding of dairy cows in the Auckland Province there is a choice of two crops suitable for milk production — soft (white-fleshed) turnips and chou moellier. The former does not need as high fertility as does the latter and is easier to feed off, with less waste, with the electric fence. There is consequently less trash and less trouble in preparing a seed-bed before the grass or crop that follows is sown down. Chou moellier is capable of greater production, which, however, is largely discounted because of the greater waste unless special precautions, which require extra work, are taken. It is, however, much more resistant to disease and if not needed, can be left to grow on for later feeding. Chou moellier requires to be sown earlier and consequently less time is available for preparing a seed-bed for growing it for summer feeding.

All in all, on poor soils and on dry soils, particularly on rolling country, turnips are preferred unless the ground is infected with club root fungi. On moist soils and on fertile soils chou moellier is the better crop to grow if the land can be prepared in time. For winter feeding, for which the crop is sown later, the land preparation is seldom difficult.

Sowing Methods

For both crops the land should be well worked, fine, and firm. When the seed is drilled 12oz. of turnip seed or 2½lb. of chou moellier seed per acre should be used, and when broadcast, 1lb. or 3½lb. per acre respectively. If the land is in good heart, serpentine superphosphate should be drilled at 3cwt. per acre or broadcast at 5cwt. per acre. If the land is not in good heart, local preliminary trials indicate that 1cwt. or 2cwt. of sulphate of ammonia per acre should be added, and if potash deficiency is acute, 1cwt. or 2cwt. of muriate of potash or double this amount of common salt should be applied. For boron deficiency borax at 8lb. to 10lb. per acre should be sown. Sulphate of ammonia, potash, common salt, and borax are all injurious to seed and should be sown separate from the seed. Serpentine superphosphate is reasonably safe mixed with seed, and it is preferable to sow soon after the mixing.

At right—On poor soils and dry soils, unless the ground is infected with club root fungi, soft (white-fleshed) turnips are preferred for summer feeding of dairy cows in Auckland Province. Below—On moist soils and on fertile soils chou moellier is the better crop to grow if the land can be prepared in time. For winter feeding on town supply farms chou moellier is preferred to swedes because of its greater milk-producing qualities.

Control of Weeds

Weeds are the greatest cause of failure or semi-failure of crops, and are particularly prevalent in land that has already been cropped. Research work carried out by the Department has shown that this can be overcome in swedes with applications of T.C.A. sprayed on the ground immediately the seed has been sown. Applications of 30lb. of T.C.A. per acre kept the land free of weeds until the swedes grew enough leaves to cover the ground and prevent any weed growth. Applications as low as 10lb. per acre

If you switch to

DRY DRENCHING

with "PHENOVIS"

Phenothiazine Pellets

You'll Drench Quicker And Minimise The Risk Of Wool Staining.

THIS scientific phenothiazine DRY drench has won New Zealand-wide praise.

"PHENOVIS" Pellets are safe, accurate, labour-saving. Accurate dosage is certain because each contains exactly 5 grammes of phenothiazine. The dose, given by a special instrument, ensures no "spit-out" and minimises risk of wool staining during drenching. Easier to carry than heavy liquids—and there's much less chance of waste. Order now for the season ahead.

Distributors:

SUMMIT PRODUCTS LTD.

Box 328, Palmerston North.

SPEEDWAY

LOW & HIGH PRESSURE

OIL BURNING BOILERS

Write for FREE Illustrated Catalogue

SPEEDWAY PRODUCTS LTD.
26 ALBERT ST., AUCKLAND, P.O. Box 159

Branches at

Ford Bldg, Courtenay Place, Wellington
156 Manchester Street, Christchurch

FRANKLIN
BRAND-EM-OL

FARMERS! NO MORE FIRE-BRANDING
Brand Your Cattle with

BRAND-EM-OL

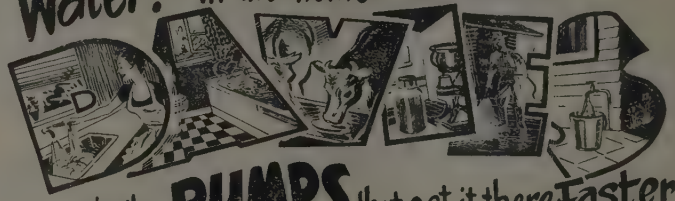
the proven Fluid Brand. Used by all Herd Improvement Associations in New Zealand.

QUICK — PAINLESS — ECONOMICAL
PERMANENT

Obtainable at all Stock and Station Agents, Hardware Stores and Dairy Companies, or write for prices and full particulars to—

Ebor Supply Co.
P.O. Box 594. Hamilton

Water! in the home... on the farm...



make the PUMPS that get it there Faster

For the home, DAVIES have designed the superb 250 G.P.H. 15 gallon pressure tank model. Automatically operated it supplies bathroom, kitchen and laundry needs with wonderful efficiency.

DAVIES have a large range of water, milk, farm pumps, indispensable to the happy running of the modern farm. Remember—DAVIES make the pumps to suit the purpose.

Automatic & Self Oiling—

D. H. DAVIES & CO. LTD.

404 Broadway, Newmarket, Auckland. Phone 26-049 Business; 87-261 after hours.

MANUFACTURERS OF MILK PUMPS, DEEP WELL GEARINGS, PRESSURE OUTFITS

---

fit

DUNLOP
TRACTOR TYRES
for 100% TYRE POWER

Dunlop Tractor Tyres are scientifically designed to translate engine power 100% in terms of tractive pull, even in the worst conditions

and they definitely last longer too!

DUNLOP NEW ZEALAND LIMITED DTT.3.9

ensured that the weeds would not menace the crop and kept it reasonably clean. T.C.A. requires moisture for activation. The optimum results are obtained by applying the T.C.A. when the soil is moist and rain follows the application. Poor results are obtained if the T.C.A. is applied to dry soil and no rain follows. Farmers establishing crops should try small applications of T.C.A., but if the ground is very weedy and partial failure of the crop is almost certain, it should be used without prior trials, particularly if moisture conditions are suitable. By making the growth of a crop much more certain T.C.A. and probably other materials being experimented with will make cropping more popular than it is today.

Weeds are the greatest cause of failure or semi-failure of crops and are particularly prevalent on land that has already been cropped. Research work by the Department of Agriculture has shown that weeds in swedes can be overcome by applications of T.C.A. sprayed on the ground immediately the seed has been sown.

Suitable Crop Varieties

For cattle feeding Giant chou moellier is preferable to Medium-stemmed, which is more suitable for sheep feeding. Leafy crosses of chou moellier are under trial and are giving promising results, though they are probably later in maturing. Four main varieties of white-fleshed turnips are available for sowing—N.Z. Green Globe (comparable with Hardy Green Globe or Imperial Green Globe imported before the war), N.Z. Red Globe (Lincolnshire Red), N.Z. Purple Globe (Purple Top Mammoth), and N.Z. York Globe (a new variety). The first takes about 3 months to grow a crop ready for feeding, Red Globe a little less, Purple Globe about 2½ months, and York Globe still less. For the dairy herd about half the area should be sown in Green Globe and about half, that nearest the gate, in York Globe. Amazingly good utilisation is obtained with the electric fence.

Lamb Fattening

For fattening lambs rape is often not satisfactory, because it may not ripen properly and the whole crop may be lost. Instead, the sowing of York Globe turnips is recommended. This variety appears in trials concluded so far in the Auckland Province to be heavier yielding than other varieties. Lambs in a trial at Wairoa last season preferred York Globe and Green Globe to Red Globe and disliked the roots of Purple Globe. (They also refused to eat kale in a nearby trial until all the weeds and grasses around the headlands had been consumed.) Because the York Globe grew a heavier yield than the other varieties, the lambs made the greatest weight gains on this turnip.

Flushing feed for ewes is usually required later than lamb fattening feed and Green Globe turnips are therefore probably more suitable. Mr. R. T. du Faur, of the Franklin Farm Improvement Club, has instanced two sheep farmers who fed these turnips last autumn, resulting in a lambing percentage of 110 and 115 instead of the 100 obtained on similar farms without flushing feed. This resulted in 20 to 30 extra lambs per acre used for flushing, obviously a most payable return. Where crops were not available farmers had to restrict grazing drastically during the flushing period for fear of facial eczema. In less dry seasons the return from cropping would not be as great, and in moist seasons crops would be of little value.

The dairy farmer on town supply can use chou moellier or Green Globe turnips for autumn feeding. As pointed out previously, chou moellier has an advantage, because if the crop is not required early, it can be allowed to grow on for later feeding in winter. Because of its greater milk-producing qualities it is preferred to swedes for winter feeding on town supply farms.

The swede crop is useful on sheep farms for winter feeding, particularly in cold climates. If the land is suspected of being infected with club root, the swedes can be replaced by chou moellier or a mixed crop of swedes and chou moellier. Where the land is of low fertility and in particular on rolling or hilly land swedes are usually a better proposition, but on heavy, rich soils chou moellier is preferred, particularly if the land is liable to cut up and become muddy with heavy feeding in winter. A new variety of swedes called Wye is showing itself very resistant to club root, being considerably better than the standard varieties, which, however, do not compare with chou moellier in this respect. Seed of this variety is not yet available in quantity, but it is hoped that this position will be rectified before long.

Lambs feeding on swedes and chou moellier. Swedes are a useful crop on sheep farms for winter feeding, particularly in cold climates, but if the land is suspected of being infected with club root, the swedes can be replaced by chou moellier or a mixture of swedes and chou moellier can be used.

ELASTRATOR Rubber Rings

Ready now for next season's

LAMB & CALF CASTRATING

UNSURPASSED for positive results!

Rubber Rings . . . the complete answer for castration.

The Elastrator Co. Ltd.
P.O. Box 226, Blenheim

GRUBNOX

has demonstrated that damage to pastures, sports areas, etc., by Grass Grub and Porina Caterpillar CAN be prevented. Containing the high concentration of 50% DDT active principal (para para isomer). GRUBNOX 50 will, if applied as directed, generally give up to *3 years protection against these pests.*

GRUBNOX

gives greater coverage and better contact with grubs and caterpillar because it is a MICRONIZED product. This MICRONIZER process, exclusive to Fruitgrowers Chemical Co. Ltd., grinds the chemicals to an ultra-fine powder. At left are shown (top) coarse particles of an ordinary ground product and (bottom) fine particles of MICRONIZED product.

Manufactured by
FRUITGROWERS CHEMICAL CO. LTD.
PORT MAPUA NELSON

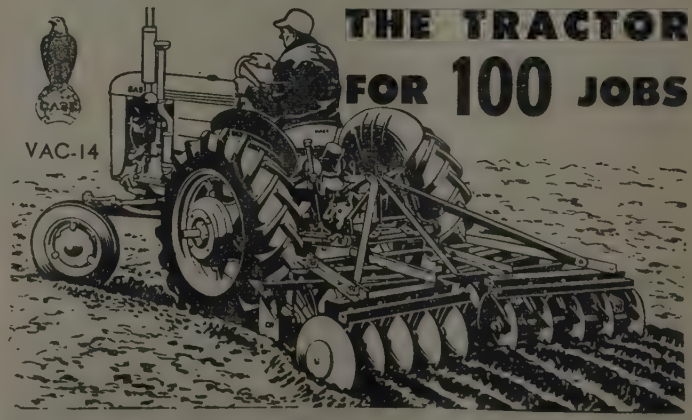
FRUITGROWERS CHEMICAL CO LTD MICROFINE

GRUBNOX

is obtainable from:
R. G. WOODHAM & CO. LTD., Ashburton.
A. S. PATERSON & CO. LTD., Christchurch.
NIMMO & BLAIR LTD., Blenheim.

South Canterbury Agents:
MORRISON BROS., Geraldine.
JAMES MEEHAN & SONS, Timaru.

GS383.9



THE TRACTOR FOR 100 JOBS

Here's the handiest tractor you ever saw for every sort of work. Plenty of power for two ploughs in most soils. Hook up Eagle Hitch mounted implements in a minute—right from tractor seat. Do all manner of field work on surprisingly little fuel. Use it for scooping, scraping, digging; for farmyard chores, construction jobs. Do your own farm improvement and maintenance to save money. Work for neighbours and make money. Ask your Case distributor for full details on the 21 H.P. 2-plough Case Model "VAC-14".

DISTRIBUTORS —

National Mortgage and Agency Co. Ltd., Dunedin, Oamaru, Timaru, Waimate, Ashburton, Christchurch, and Hokitika.
J. G. Ward & Co. Ltd., Invercargill and Gore.
C. W. Parker & Co., Blenheim.
North Island enquiries to:
Box 292, Christchurch.

©.6808

CASE

Increasing Production on a Bay of Islands Farm

By N. A. CLARKE, Instructor in Agriculture, Department of Agriculture, Kaikohe

THE means by which increased production can be successfully and economically obtained through land development are exemplified on the farm owned jointly by Mr. W. R. Paterson and his sons W. B. and D. B. Paterson, of Purerua, Bay of Islands. Purerua, also the name of the farm, is an east coast peninsula in the northern part of the Bay of Islands between Mangonui Inlet and Takou Bay.

UP to 1948, when Mr. Paterson took over, the 9000 acres of rolling to hilly property was managed as an estate and carried 2000 ewes, 1000 dry sheep, and 600 cattle. By the 1953-54 season the carrying capacity had been built up to 3200 ewes, 1200 hoggets, 300 wethers, and 800 cattle. All stock are now in good condition, the wool production has been almost doubled, the lambing percentage has been increased, and some lambs are now fattened.

Topography and Climate

The farm varies in topography from gently rolling to fairly steep hills with little of the property being flat. The sea provides two-thirds of the boundary and the area is in the 40in. to 60in. rainfall belt. The sea border and sheltered position ensure a mild climate but often very dry summers.

Soils

Approximately half of the farm consists of the greywacke clays common to the east coast areas of mid-Northland. Marua clay loam and Te Renga stony clay loam are the dominant types. Approximately a quarter of the area is gumland. Part of the gumland is from greywacke forming the Hukerenui silt loam and the rest from a claystone forming Wharekohe silt loam, some of which overlies a pan. The remaining area consists of volcanic loams and ironstone soils. This one farm contains soils all of which are considered difficult to develop and farm, namely, the greywacke clays, gumlands, and ironstone.

Development Programme

Sowing of Pastures

In 6 years 730 acres of new pasture have been sown down; 600 acres are from virgin scrub and the remaining 130 acres from reverted old pasture. In the first season 50 acres of ironstone were cropped and 80 acres of gum country were disced. The ironstone was cropped a second time and the gum country allowed to fallow. Both areas were sown to pasture in 1950. A fallow is necessary when virgin country is being broken in and Mr. Paterson considers a 2-year rather than a 1-year fallow is advisable, except on the steeper slopes, where heavy rains may scour off the loose soil.

The initial cultivation is carried out with giant discs with 24in. blades. After the fallow the giant discs are used again followed by as many discings and harrowings as are necessary to bring the land to a seed-bed. However, the different soil types require different amounts of cultivation; for example, the greywacke clay often takes a lot of breaking down and tends to go cloddy, especially in dry weather. The gumlands usually work down well, but if worked too much, tend to go powdery. The ironstone and volcanic loams usually work down easily.

Other factors which affect the number of cultivations necessary are the quantity of rubbish on the area and the amount of levelling required to bring some areas into a condition where implements can traverse the ground satisfactorily. The final preparation of the seed-bed is done with

HEADING PHOTOGRAPH: Improved pasture on the Paterson farm. The area to the right of the fence and in the background is still undeveloped. Cross shows location of farm.

the harrows and roller and the seed is sown on a rolled surface and harrowed in.

In 1951, 90 acres were sown down; in 1952, 150 acres; in 1953, 250 acres, and in 1954, 110 acres. The general pasture mixture used has been:—

	lb.
Perennial ryegrass	15
Short-rotation or Italian ryegrass	10
Paspalum	6-8
Cocksfoot	4-5
Red clover	2
White clover	2
Subterranean clover	2
	41-44

This mixture is used on all soil types. The only change in the seeding rate that has been introduced in the last year or two is the increase in the cocksfoot seeding by from 1lb. to 2lb. per acre after it was seen how well the cocksfoot was thriving in the pasture.

The new pastures are in good condition and consist dominantly of perennial ryegrass and white clover. Some subterranean clover and cocksfoot are evident in all pastures. There is also a trace of red clover showing in the moister paddocks, and paspalum is just starting to become established.

Lime and Fertiliser Requirements

Before the final working up of the seed-bed 2 tons of lime per acre is applied and 3cwt. of superphosphate is sown with the seed. In the first spring all pasture receives 3cwt. of superphosphate; sometimes 3cwt. of basic slag is applied instead with varying results. Annual autumn topdressings consist of 5cwt. of lime and 3cwt. of superphosphate.

So far the same lime and fertiliser programme has been applied to all soil types and has given good initial results. The quantities applied have been adequate to satisfy the requirements of each soil type. From now on the use of potash will be necessary; for example, approximately ½cwt. per acre annually on the volcanic loams, except where a hay cut has been taken, when 1cwt. per acre will be required the following year. The gumlands will also require potash, probably 1cwt. initially followed by ½cwt. annually. The yearly maintenance lime requirement of the volcanic complexes would be adequately provided by 5cwt. per acre. The use of molybdenum on the ironstone, greywacke clays, and the gumland clays (Hukerenui silt loam) would be economic.

The use of molybdenum on the gumland (Wharekohe silt loam) is not necessary, but on this soil type the use of copper may become warranted, as recent trials have given definite copper responses.

Increased Carrying Capacity

Irrespective of soil type all the pastures are remarkably even and in good heart. The best pasture, a gumland flat, now carries 4 ewes plus 1 young cattle beast—equivalent to 6 sheep—per acre. This carrying capacity is approximately 15 times greater than that of the old, untopdressed, danthonia pastures.

Cropping

Only the volcanic soil types are suitable for cropping. Most of this country is cropped for summer supplementary feed before being sown down to pasture. Crops of chou moellier and turnips are grown to boost carrying capacity over the drier summer period.

Stock Management

At this stage it must be emphasised that the farm, through its mild climate and well-sheltered position, has a high winter carrying capacity, but due to the dry summers it has a low summer carrying capacity.

Of the Romney ewes 2200 of the 3200 are mated to Romney rams for replacements and the remaining 1000 to Southdown rams. These latter ewes are grazed wholly on the topdressed country. The downcross lambs are all fattened either on their mothers or on the supplementary crops. The Romney wether lambs are sold in early summer. In the severest of dry summers it may be necessary to sell some of the lambs in summer and buy more back in autumn. Improved subdivision enables the ewes to be tupped in smaller paddocks instead of in large blocks and this, with the better feeding, has increased the lambing percentage from 70 to approximately 80.

Weaner cattle (with the exception of a portion of the heifers for replacement) and the stores are sold in spring. A certain number are bought again in autumn to be sold the following spring. To adjust the carrying capacity of the farm to the dry summers, only the breeding cows and replacement heifers, ewes, and replacement ewe lambs are kept on the property. The store cattle, weaners, and wether lambs are sold and bought to suit the farm as a whole and the favourable market conditions.

Factors in Success

The development of this property containing problem or marginal land has not been brought about by any new or secret methods, but by the efficient application of the four essentials of land development—labour, finance, machinery, and management—along sound and proven methods of farm management. The essential points are as follows:—

1. Long fallow of virgin land.
2. Adequate cultivation.
3. Sowing of new pasture.
4. Efficient utilisation of labour.
5. Use of supplementary crops for periods of low pasture production.
6. Good grazing management of pastures and their adequate liming and manuring.
7. Management of stock to suit pastures and the farm as a whole as well as market conditions.

Meteorological Records for April

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	63.2	+ 2.1	78.1	45.7	1.84	11	— 3.76	1.45	27	129.2
Auckland	160	64.2	+ 2.9	77.3	50.2	2.16	10	— 2.23	0.63	27	130.6
Tauranga	10	61.6	+ 3.1	77.4	44.1	7.22	12	+ 2.20	2.58	21	164.8
Ruakura	131	59.5	+ 2.9	79.5	35.7	5.18	10	+ 1.44	1.97	23	129.1
Rotorua	975	58.8	+ 3.4	78.2	36.1	7.25	10	+ 2.62	2.87	23	148.7
Gisborne	12	59.6	+ 1.7	79.6	41.0	8.49	13	+ 4.83	4.15	23	175.3
New Plymouth	160	61.1	+ 3.0	72.0	41.0	4.37	11	— 0.41	1.22	4	162.1
Karioi	2125	53.4	+ 3.0	78.0	30.0	7.09	11	+ 3.27	2.00	23	
Napier	5	59.8	+ 1.3	81.0	42.5	5.67	9	+ 3.04	2.49	22	156.2
Wanganui	72	59.8	+ 2.3	78.6	43.6	3.22	11	+ 0.42	1.07	27	150.0
Palmerston North	110	58.9	+ 2.3	78.5	38.2	4.16	15	+ 0.80	1.18	23	131.0
Waingawa	340	57.2	+ 2.7	83.5	35.0	5.23	13	+ 2.33	1.54	23	169.2
Wellington	415	57.6	+ 1.5	71.8	41.5	2.69	13	— 1.12	0.82	28	163.2
Nelson airfield	5	56.9	+ 2.8	79.9	34.7	1.68	7	— 1.27	0.38	27	196.5
Blenheim	12	58.4	+ 2.9	79.6	33.9	1.42	8	— 0.62	0.51	27	204.1
Hokitika	15	55.4	+ 2.5	69.6	34.0	7.08	13	— 1.75	2.01	3	123.8
Hanmer	1270	54.2	+ 2.7	82.0	29.0	0.88	5	— 2.48	0.41	27	156.6
Christchurch	22	56.6	+ 3.1	81.6	35.6	0.81	7	— 1.04	0.39	29	142.7
Ashburton	323	56.0	+ 3.4	85.2	31.8	0.21	4	— 2.20	0.08	14	144.5
Timaru	56	56.0	+ 3.0	82.4	35.3	2.57	9	+ 0.91	1.99	21	133.3
Alexandra	520	54.1	+ 3.0	81.0	26.1	0.18	6	— 1.17	0.07	29	163.7
Taieri	80	52.6	+ 1.3	84.0	28.8	1.86	11	— 0.24	0.66	1	
Invercargill airfield	9	51.6	+ 1.7	69.2	27.4	4.43	18	+ 0.78	0.84	1	90.9

The Home Garden in July

WHETHER July or August is regarded as the beginning of the garden year depends on the district or on the situation of the garden, but in most gardens the work of sowing and planting is not begun in earnest until August or even later. If the weather is favourable, small sowings of hardy subjects can be made in July in most well-situated gardens where the soil is well drained and free working. Elsewhere garden work should be confined mainly to such activities as tidying, digging if the soil is in suitable condition, turning the compost heap, sorting over root crops in store, burning unwanted, diseased, or woody rubbish which cannot be composted, or establishing and renewing garden features. In this article A. G. Kennelly, Horticultural Instructor, Department of Agriculture, Dunedin, discusses work in the vegetable garden in July.

JULY is a good time to dig over weedy corners and to clear away and stack tidily seed boxes, odd pieces of timber, garden stakes, and similar material which, unless it has a free circulation of air under and round it, is likely to provide congenial refuges for such garden pests as slugs, snails, millepedes, weevils, slaters, and earwigs. The weeds which so often surround untidy corners should also be cleared away, as they not only frequently serve as host plants for pests, but carry over virus diseases from one season to another.

Small sowings of such comparatively hardy subjects as spinach, silver beet, broad beans, carrots, turnips, radish, and spring onions can be made where climate and soil conditions are favourable. Lettuce and summer cabbage and cauliflower can be sown, though in less-favoured districts a frame may be necessary. If cloches are used, all the seed mentioned can be sown in well-drained soil if the cloches are put in position about a week before sowing to enable soil to warm and to some extent to dry out.

Hardy subjects such as spring cabbage and shallots can be set out in manured and well-drained soil, and where conditions are not too severe lettuce and cauliflower can also be set out. Established rhubarb and asparagus beds should be cultivated and where conditions are warm enough to enable the plants to respond liquid manure can be applied.

Where soil conditions permit the ground can now be prepared for new beds of rhubarb and asparagus. It should be deeply dug and organic manure such as farmyard or stable manure or blood and bone dug in. Deep digging is desirable on most heavy or fine-grained soils, as it improves drainage, which is an important factor in successful production.

Tubers of Jerusalem artichoke can be sorted over and small tubers planted in districts where soil conditions are suitable; potatoes in store can also be sorted over and rotted ones eliminated. In early districts a first selection of tubers can be set out to sprout.

During wet weather tools can be sharpened and cleaned. Garden furniture, bins, shelves, and benches can be built or repaired. Soil can be sterilised and seed boxes made or repaired. Woody or diseased rubbish should be burnt and the ash stored in a dry place; other soft garden trash should be composted.

Planning for New Season

Planning gardening work for the forthcoming year is important, because it has a considerable bearing on production and garden efficiency, and to the keen gardener it is very interesting. There are several ways of plan-

Heading photograph by Green and Hahn.

the remedy for **MASTITIS** *is in your hands.. !!*

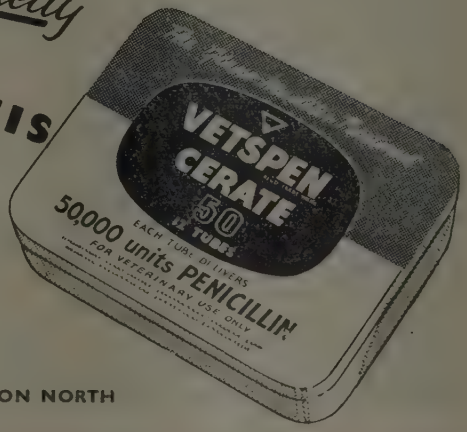
You can keep your herd at maximum production by defeating profit-stealing mastitis with Vetspen Cerate.

Vetspen Cerate is available in four strengths, from your usual supplier. '500' each tube delivers 300,000 units Procaine Penicillin plus 200,000 units Crystalline Penicillin.

100 each tube delivers 100,000 units Penicillin.

50 each tube delivers 50,000 units Penicillin.

25 each tube delivers 25,000 units Penicillin.



GLAXO LABORATORIES (N.Z.) LTD., PALMERSTON NORTH

Ask for and insist on...

JOHNSON'S

PLAIN ENGLISH FENCING WIRE

STOCKS NOW AVAILABLE

At Stock and Station Agents and Hardware Merchants.

JOHNSON'S WIRE is made expressly to last — drawn with the skill of 150 years' experience from carefully chosen steel, protected by **PATENT HOT DIP GALVANISING** the heavy coating of which ensures long life under New Zealand's climatic conditions. It is practically immune from the corrosive action of salt-laden air, whereas, inferior, thinly galvanised wire needs constant renewing. Johnson's Wire is durable and will save you costly repairs, renewals and re-erections.

Johnson's wire meets, in every respect, the requirements of the New Zealand Government's standard Specification 143 for Type "A" First Grade galvanised wire.

WHEN YOU ORDER FENCING WIRE
INSIST ON JOHNSON'S

RICHARD JOHNSON & NEPHEW LTD.

MANCHESTER, ENGLAND

Sole N.Z. Agents:—

JOSEPH NATHAN & CO. (N.Z.) LTD.,
P.O. Box 1792, Wellington
P.O. Box 949, Auckland
P.O. Box 1604, Christchurch

ning production. Some gardeners rely on a notebook in which each section of the garden is numbered; others prefer to draw up a plan either roughly or accurately, for efficiency can usually be greatly increased if a carefully prepared plan is followed. The plan should be designed to ensure a supply of fresh vegetables all the year round and at the same time to make maximum use of available ground. It should give a simple rotation of crops; for instance, crops such as brassicas, celery, marrow, and pumpkin, which do well on soil richly dressed with only partly rotted organic manures, can be rotated with tap-rooted crops such as carrots, parsnips, and beet, which are specially suited to ground that was richly manured with organic material the previous year.

The following points should be considered in planning production:—

1. Perennial crops such as asparagus and rhubarb should be planted where they will not interfere with winter digging or trenching.

2. Tall crops such as sweet corn, broad beans, and tomatoes should be planted where they will not overshadow other crops. Where practicable use should be made of them to give shelter to other crops.

3. Where possible rows should be placed so that they are exposed to a maximum of sunlight.

4. If crops such as pumpkin and marrow are grown in rows, the runners should be pegged and stopped to prevent them over-running smaller crops.

5. Weeding and cultivation are usually easier when vegetables are sown in rows rather than broadcast in beds, and where a number of small sowings are to be made one long row of different subjects is preferable to several short rows, even though each is of only one kind of vegetable.

6. Cultivation is usually easier and danger of ground consolidation less where spacing is liberal; inter-row cropping is rarely as successful as where vegetables are well spaced.

7. In sloping gardens it is usually advisable to have the rows running across rather than up and down the slope.

8. Herbs are best planted close together and in easily accessible positions.

9. To avoid soil exhaustion and to keep diseases associated with it to a minimum, correct rotation should be practised. No two crops of the same family should follow each other in succession. Though it may not always be a perfect solution, it is practically always safe to alternate in any order the principal classes of vegetables—tap rooted (carrots, parsnips, etc.), fibrous rooted (cabbage, cauliflower, etc.), tubers (potatoes and kumaras), and legumes (peas and beans).

The need for keeping a record of gardening activities cannot be over-emphasised. This information can be kept in a notebook and should include information under at least the following headings: Vegetable and Variety, When Sown, When Transplanted, Planting Distances, Crop it Followed, When Ready for Use, Yield, and Remarks (manure, frost, etc.).

[*Photo News*

It is not always easy to remember when and where a particular kind of seed was sown and the use of good, clearly marked labels is important in garden operations.

Asparagus

If the work has not yet been done, established beds of asparagus should be dressed with a complete fertiliser or with well-rotted farmyard manure. New beds are usually planted in August, but where the ground is reasonably dry it is possible to plant by mid-July. Single rows should be about 48in. apart and the plants set about 18in. to 24in. apart in the rows.

The site should first be dug deeply and if necessary drainage improved by the addition of open material such as shingle or stones or the installation of field pipes leading out to a lower level where excess water can drain away. All perennial weeds and grasses should be removed and material such as well-rotted stable or farmyard manure dug into the bottom spit.

Popular varieties of asparagus include Mary Washington, Martha Washington, Connovers Colossal, and Paradise. Newer varieties, such as K.B.F. are claimed to be exceptionally high yielding.

Broad Beans

It is not too late to sow broad beans and where they are appreciated and a first sowing was made in autumn a sowing made now will provide a succession. They do not require special soil, but it is not advisable to sow them in light soils which tend to dry out. They do well in fairly heavy, well-drained soil that has been thoroughly cultivated and into which has been dug a moderate amount of organic material such as compost or well-rotted farmyard manure. Heavy soil should be deeply dug, preferably a considerable time before sowing.

Though a small amount of potash is often beneficial, particularly on light soils or where disease is troublesome, the principal nutrient required on most New Zealand soils is phosphoric acid. A dressing of 2oz. to 4oz. of superphosphate per square yard usually gives good results, though a small amount of nitrogenous fertiliser in addition to phosphoric acid and potash may be advisable on well-worked home garden soils.

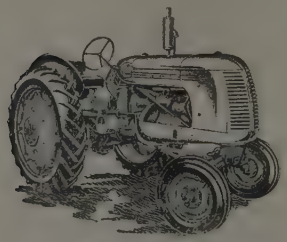
Seed should be sown in double rows about 10in. apart, with the seed placed diagonally 4in. to 6in. apart and 2in. deep in the bottom of a shallow trench or drill 3in. deep. Germination is usually good, but it can be speeded up by soaking the seed for 12 hours before sowing, and it is usually advisable to plant a few extra seeds at the ends of the rows to provide plants to fill gaps. A quart of seed will usually sow about 50ft. of double row.

Now choose the tractor you need from Cockshutt's Great 26

26 Models from 20 to 50 h.p.
Leaders in the 2, 3, 4
and 5 Plough Tractor Field.

BRANTFORD CANADA
COCKSHUTT
FARM EQUIPMENT

40 and 50 h.p. Models (Available in Petrol or Diesel) ★ Powerful 6 cylinder engine ★ Heavy duty 6 forward speed transmission ★ Famous "LIVE" Power Take Off ★ New "LIVE" hydraulic system ★ 4 variations in front wheel equipment.



20 and 30 h.p. Models ★ Heavy duty 4 cylinder engine ★ Power saving 4 forward speed transmission ★ "LIVE" Power Take Off ★ "LIVE" hydraulic system ★ New improved 3 point hitch.

Before you buy any tractor, enquire about this great new Cockshutt fleet — it's power packed, power proved. Here in any one of these 26 new models are the extra value features you have always wanted in a tractor—greater stamina—smoother power—greater economy—lower upkeep cost. Cockshutt has them all — and they're all yours when you choose a Cockshutt.

Enquire for further details from :—

DORING IMPLEMENT SUPPLIES LTD.

3rd Floor, Atlas Building, Ghuznee Street, Wellington. P.O. Box 1179 Telephone 54-954.
or your nearest DORING Branch.

Fraser's

di-tergol★

ALKALI-ACID DETERGENT FOR CLEANING MILKING MACHINES

★ Di-tergol detergent is guaranteed to comply with the Ruakura B-Type specification and is **recommended and approved by the Dairy Division.**

Prices: Alkaline Powder: 18/6 per 7lb. tin. Bulk price 2/6 per lb. in 28lb. tins.

Double Strength Acid Powders: 1lb. tin 7/-; 7lb. tin 42/3

Ask your local Dairy Co., Stock and Station Agent or Store.
Mfrs. Fraser Products Ltd., Auckland

Ship via London

The
PORT OF LONDON
AUTHORITY

A Self-governing Public Trust for Public Service

London—the Premier Port of the Empire—equipped for all types of ships and cargoes.

For full particulars apply to :
Mr. W. C. Perkins,
22 Loftus Street,
Sydney.

Brussels Sprouts

Tall varieties of brussels sprouts usually require support if they are growing in exposed positions. Well-grown plants carrying a heavy crop are worth staking individually, but for most crops at this period earth banked against the stems usually gives satisfactory support.

Sprouts should be picked systematically from the bottom, and to permit a good circulation of air about the plants leaves should be removed as they begin to turn yellow; at that stage they snap off cleanly at the junction with the main stem. Healthy green leaves are usually best left. If grey aphis is troublesome, plants can be sprayed with nicotine sulphate (1 fl. oz. plus about ½oz. of soap to 4 gallons of water) on a still, warm day or with H.E.T.P. 1 : 800.

Cabbages

Probably the majority of home gardeners buy their cabbage plants when planting time comes, but those who prefer to grow their own seedlings can now sow a quick-maturing variety such as Golden Acre. A warm, sheltered situation with favourable soil conditions is necessary, and where these conditions are lacking it is advisable to use cloches or a cold frame or well-ventilated glasshouse. If a suitable bed is not available, seed should be sown in boxes filled to a depth of 4in. to 5in. with light, open-textured soil so that when the plants are sufficiently developed they can be removed from under the glass and hardened off.

Organic matter such as well-rotted garden rubbish (preferably suitably composted), leafmould, and animal manure mixed with straw or sawdust is one of the keys to maintaining fertility of garden soil. It should be stored tidily in a dry place until needed for digging in.

Conditions should encourage rapid germination and growth. The plants should be thinned if crowded, as the desired type of seedling for transplanting is one with well-developed roots and strong, rather stocky stem and leaf growth.

Spring Cabbage

In poorer soils established crops of spring cabbages should be encouraged to make strong, quick growth by regular applications of liquid manure. If organic liquid manure is not available, sulphate of ammonia or nitrate of soda at 2oz. to 4 gallons of water can be applied.

Spring or pointed type of cabbage can still be set out in July and this is a practice that is favoured by some growers in districts where the winters are severe and the land tends to lie cold and wet. If well-grown seedlings are planted out in richly manured, well-drained soil, the plants mature very quickly.

Cauliflowers

Most of the recommendations for growing cabbages apply also to cauliflowers, though cauliflowers are more tender. Plants are likely to fail if they receive a check from such conditions as dryness, severe frost, cold wind, or injury during transplanting.

Lettuces

Seed of lettuce can be sown outside where conditions are favourable. A

[*Green and Hahn*

Broad beans are hardy and can still be sown to provide a succession.

Easy-running PREM

LIQUID PHENOTHIAZINE

gives you "shot-gun coverage" for maximum worm-killing power

The "shot-gun coverage" of an ultra-fine dispersion of particles — each completely separated, each available individually to do its worm-killing job.

Perfect suspension from top to bottom of the tin so that **PREM** never settles out — never cakes or goes hard—reaches you ready for immediate use.

Pours freely for speedy, clean drenching with instruments.

N.Z. Manufacturers & Distributors:
PREMIER PRODUCTS LTD., Wellington.
P.M.10

Issued by the New Zealand Dept. of Health

HYDATIDS

must be stamped out!

About 50,000 country dogs in New Zealand are infected with Hydatid tapeworms, whose tiny eggs are passed on to human beings and stock animals, and may develop into dangerous cysts. Probably between a third and a half of our sheep, cattle and pigs have hydatid cysts, usually in liver or lungs. In stock, hydatid cysts result in the rejection of thousands of pounds worth of meat annually. Country dogs which feed on offal may become carriers of Hydatid tapeworms. The safest and most effective remedy is to dose your dogs *regularly* with arecoline.

Arecoline tablets are supplied with your dog licence . . .

HYDATIDS is a serious and costly disease and must be stamped out!

- After handling animals, never put hand to mouth without washing. Children should wash hands before every meal.
- Wash carefully all vegetables eaten raw.
- Never throw raw liver or lungs of sheep to dogs. Cut offal into slices and boil first. Otherwise burn or bury it.
- Dose your dogs with a vermifuge every 3 months and expel the worms.
- *Rid your dog of worms now! Then it is no longer a danger to you or others.*

. . . DOSE YOUR DOG NOW

MR. FARMER . . . your co-operation, please.

4.4a

For Quality

AND ECONOMY

AFFCo *Champion*

DAIRY and PIG MEAL

AUCKLAND FARMERS' FREEZING CO. LTD.

[*Green and Hahn*

Cabbage plants should not be removed from the seed-bed until they are large enough. The best results are likely to be obtained from planting out sturdy, close-jointed, hardy plants that have been lifted with a fibrous tuft of root and soil.

prepared bed in a sunny situation is desirable unless the soil is well drained and the climate is very good. Alternatively, seed can be sown in boxes of prepared soil in a frame or cool glasshouse. Lettuces are tough and bitter if grown slowly, and if checked, they may make poor growth and fail to heart. Most varieties succeed best in cool, moist, well-drained soils that are well supplied with well-rotted organic matter. Weed control is very important, particularly in the early stages of growth.

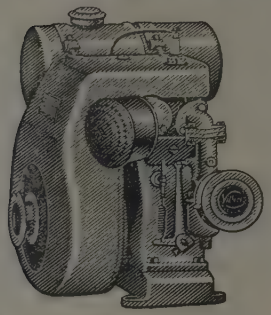
Lettuces require a constant and fairly high degree of soil moisture from seeding to harvest. Fairly heavy applications of well-rotted organic manure such as farmyard or stable manure or of blood and bone are advisable on most home garden soils. Usually they are best supplemented by a complete fertiliser applied at 1oz. to 2oz. per square yard, but on soils that are in good condition the application of nitrogen only may be sufficient. This is best applied as side dressings of nitrate of soda or sulphate of ammonia at ½oz. per square yard.

Seed should be sown thinly ¼in. deep, and if outside, should be sown in rows 12in. apart; later the plants should either be thinned or transplanted to 8in. to 12in. apart in the rows. Transplanting is satisfactory for early sowings, though later in dry districts it is usually advisable to sow seed where plants are to mature and to thin seedlings.

Varieties of lettuce suited to July sowing are Imperial D and Imperial 615 and New York 515 (Webbs Wonderful) and New York 12. They are very adaptable and can be grown satisfactorily for a long period in most districts.

Silver beet is one of the most useful and long-standing vegetables. [*Green and Hahn*

Outstanding STAMINA



and

DEPENDABILITY

Quick starting, dependable VILLIERS Engines are tigers for hard work. Their sturdy, simple construction and precision-engineered parts ensure maximum efficiency at lowest cost.
1 h.p., 2 h.p., 2½ h.p., 4 h.p. Models. Also available in same sizes with 3 : 1 and 6 : 1 reduction gear.
Available from dealers everywhere.

Villiers

4-STROKE ENGINES

N.Z. Factory Representatives:
F. W. CAVE LTD., P.O. Box 1685, Auckland.

3-IN-ONE OIL NOW
ANTI-RUST

gives complete protection!

It's better value too! "3-in-One" Oil has more penetrating power, greater "oilyness", to make it the ideal ANTI-RUST lubricant for home, office, workshop and garage. Buy "3-in-One" Oil today.

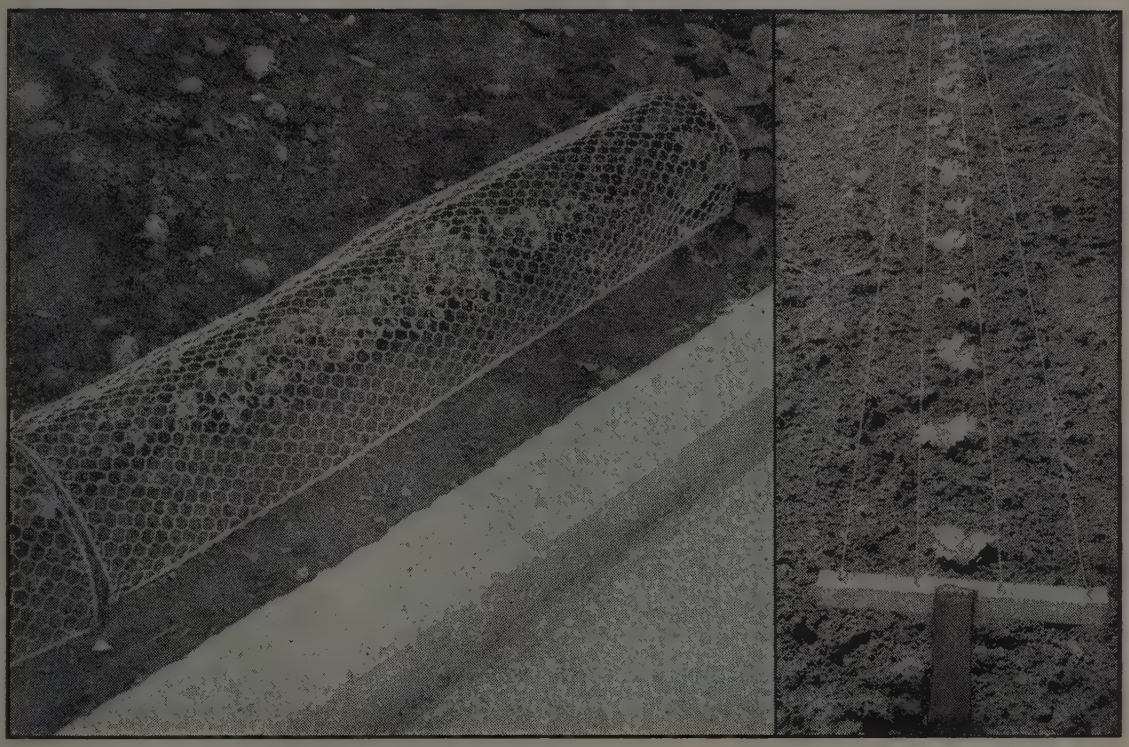
B5.2

CUTS THE WAIT - * for market WEIGHT

Market weight and condition earlier, less food consumed per pound weight gained—fewer runts. These are the advantages gained by using Vetspen Ration. The average weight increase in pigs, when Vetspen Ration has been added to their feed, is in the region of 10%. One 8oz. tin contains sufficient for 2 pigs from creep feeding to a liveweight of 200lb.

GLAXO LABORATORIES (N.Z.) LTD., PALMERSTON NORTH

DISTRIBUTED THROUGHOUT N.Z. BY SARGOOD SON & EWEN LTD.



[*Green and Hahn (left) and Sparrow (right)*

Early in the season food for birds is often scarce and they are then particularly damaging to seedlings. The wire cover shown at left gives effective protection if the ends are blocked. Another way to protect seedlings against birds is to stretch cotton over the rows as shown at right.

Onions

In districts where it is customary to sow the onion main crop in autumn, plants can be set out 3in. to 4in. apart in rows 12in. apart if conditions are favourable. In most southern districts the main crop is sown in September, but in favourably situated gardens where soil conditions are good a small early sowing may be made toward the end of the month.

The onion bed should be thoroughly cultivated and preferably manured in autumn with well-rotted stable or farmyard manure. The onion requires a firm bed, but the texture of the soil should be fine and crumbly; good drainage is essential. Though the onion bed should be firm, it should not be consolidated so that a crust is formed, as the root system of the onion is limited in size and comparatively weak. The amount of firming will therefore vary according to whether the soil is light or heavy or is inclined to be dry or fairly moist. Light, dry soil can be consolidated by treading, usually with a shuffling walk; heavy soil, especially if it tends to be wet, requires very little firming. Rain usually soon settles it sufficiently.

Where there is insufficient organic manure a dressing of bonedust at 3oz. to the square yard and of superphosphate at 2oz. to the square yard forked lightly into the soil surface is advantageous. The addition of potash at about 1oz. to the square yard should prove beneficial on many soils. Onion seed should be sown thinly ½in. deep in rows 12in. apart. Half an ounce of seed should sow about 100ft. of row.

Peas

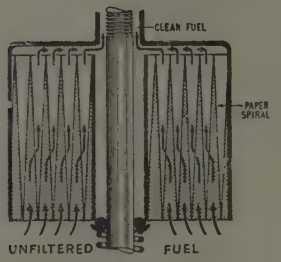
In districts where the weather is favourable an early sowing of peas may be made in well-drained soil that preferably should be medium to light. Though peas do well in cool, but not cold, weather, losses are common with early sowings because of the attack of soil-borne diseases. These are favoured by the inability of the seed or young plants to make immediate vigorous growth in cold, wet soil, which often is all that is available for early sowing.

Peas for early sowing should be dressed with a suitable seed protectant, which can be obtained from most seedsmen. Peas repay good cultural methods, and the ground should be deeply dug and of good humus content. Seed should be covered about 1in., preferably in a shallow drill or trench about 2in. deep. In very light soils seed can be sown a little deeper, but for early sowing shallow planting is usually preferable. Seed can be sown as single rows in narrow drills or as band rows in which the seed is zigzagged 2in. to 3in. apart. Rows should be 20in. to 36in. apart, according to height of the variety. One pound of seed is sufficient to plant about 100ft. of row. William Massey and Little Marvel are the most popular early varieties.

Potatoes

Stored potatoes should be sorted over to eliminate rotten ones. Where the tuber moth is likely to be troublesome D.D.T. should be dusted in the eyes of the tubers. Points of infestation of tubers infested in store are usually scars or the eyes, where the eggs are laid. The larvae or grubs usually work at first just under the skin, later tunnelling through the tubers and leaving their excrement behind in the tunnels; the damage caused provides a congenial environment for organisms of decay. As the moth is a night flyer, it is seldom seen during the day unless disturbed. It is generally grey, with forewings more or less spotted and mottled and hind wings narrower than the forewings and buff. The wing-spread is a little more than ½in. The moths generally

Amazing!



a PAPER filter for oil fuel

Scientific tests have proved conclusively that the new C.A.V. Paper Element filter is by far the most effective device yet produced for ridding diesel oil of damaging dust particles.

This means that C.A.V. Fuel Injection Equipment will give you even longer trouble-free life, and prolonged economy of fuel consumption, with maximum power.

For certain C.A.V. Fuel Injection models, not already fitted with the new Paper Element Filter, inexpensive conversion sets are available. It will pay you handsomely to look into the matter.

Consult your nearest Service Agent for

C.A.V

FUEL INJECTION EQUIPMENT

	Phone
Whangarei Engineering Co., **Whangarei**	2639
Joseph Lucas (N.Z.) Ltd., 75-77 Beach Road, **Auckland** 3 lines	34-330
Unity Buildings, **Hamilton**	40-840
Grey Street, **Tauranga**	1010
Commerce Street, **Whakatane**	124
L. M. Silrer & Co. Ltd., 263 Victoria Avenue, **Wanganui**	2632
King Street, **Palmerston North**	5989
Jervois Quay, **Wellington**	54-555
Wooff & Salvesen Ltd., 17-19 Lichfield Street, **Christchurch**	87-403
A. M. Duncan, 34 Latter Street, **Timaru**	1594
Wooff & Salvesen (Dunedin) Ltd., 260 Cumberland Street, **Dunedin**	13-642
Ross Mitchell Ltd., Don. St., **Invercargill**	930

ATOS

ALLEN TRACTOR OPERATED SHOVEL

IMPROVED MKIII MODEL

The ideal machine for Builders, Contractors, Farmers, Local Authorities, Gas, Water & Electricity undertakings.

Entirely Hydraulically Controlled

This highly mobile tractor attachment has been designed to overcome the problem of expensive hand labour on building sites, farm drainage, and similar excavation jobs. The operation of ATOS is extremely simple as there are only 3 controls—ALL HYDRAULIC . . . no brakes, clutches or gears to give trouble.

Easily converted from a shovel to a trench digger in a few minutes by simply changing the bucket.

New Zealand Distributors:

THE DOMINION MOTORS LIMITED

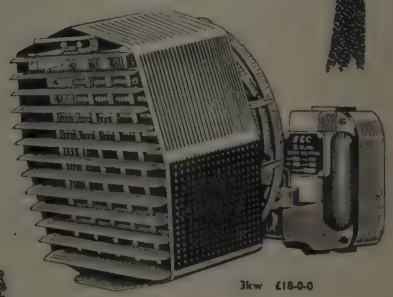
Head Office, Courtenay Place, Wellington, and at Auckland, Christchurch and Timaru. Authorised dealers throughout New Zealand.

Ideal heating

for factory, workshop, store, farm building, hall, office, church.

with

G.E.C. ELECTRIC UNIT HEATER



3kw £18-0-0
5kw £21-10-0

Write for folder containing details about control gear, installation and wiring diagrams, etc. to—

★ Low running cost. Simple, inexpensive installation and maintenance. Clean. Quick heating effects. Thermostatic control if required. Fan motor totally enclosed. Fan only can be used providing cooling air movement. Direction of air flow adjustable in both horizontal and vertical planes.

BRITISH GENERAL ELECTRIC CO., LTD.

Wellington, Auckland, Christchurch, Dunedin. Also at Hamilton, Napier and Invercargill.

UH 101

hide under rubbish or loose lumps of soil during the day.

Regular picking over of potatoes in store where infestation is suspected is very important, for under favourable circumstances the development of the life cycle of the moth may continue throughout the whole year or as long as the potatoes contain enough food to mature the grubs. Though the eggs, which are minute, white, and glistening, are easily recognised, and may be deposited in batches of up to 30 in the eye or on any rough scar on a potato, the first stages of infestation after the eggs have hatched are often rather difficult to detect, as the entrance hole is very small and is webbed over. Later pinkness can usually be detected around the injured eye and excrement can be seen held in the web at the entrance of the burrow.

Where tuber moth infestation is likely potatoes stored loosely on a shed floor can be protected by being kept covered with a closely woven material and examined regularly for infestation.

Though it is much too early in most districts to plant main-crop potatoes, a few tubers can be planted in warm, sheltered situations where there is very little frost or else they can be set to sprout. Even where frost is fairly heavy some potatoes may be grown if the home gardener is prepared to keep top growth covered, usually by earthing it over to protect it.

Soil for early potatoes should be well drained and should work freely. Even where it is not intended to plant for some time seed of early potatoes can be set in trays in a light, airy, frost-free situation to green and sprout. Tubers set out for sprouting and greening before planting can be protected by dusting with an insecticide

[*Green and Hahn*

Above—Peas can be sown in July if conditions are particularly favourable. Below—Growth is slow at this time of year and plants such as lettuce should not suffer from the competition of weeds.

[*Sparrow*

[*Green and Hahn*

The best varieties of curly kale are fine in texture and flavour. Kale stands well and is one of the hardiest vegetables.

containing rotenone (derris) or preferably with a light application of D.D.T.

Rhubarb

If it is intended to make a new rhubarb bed, crowns should be examined and if the buds are starting to grow, the crowns should be split with a sharp spade and replanted about 30in. apart each way with only one or two buds in each division. Established beds should be dressed with manure if this has not already been done.

The preparation of new beds should be thorough, as rhubarb is a perennial and if new crowns are planted in ground that is poorly drained or inadequately manured or in ground from which perennial weeds such as convolvulus, couch, or oxalis have not been removed, results are likely to be disappointing. New beds should be liberally dressed with well-rotted farmyard manure or compost. Blood and bone is satisfactory where the more bulky organic material is unobtainable.

Rhubarb can be forced in any situation where there is adequate warmth. An early variety should be chosen and covered with a good-sized box or some straw to exclude frost and retain any available heat. Forced rhubarb has less development of the leaf blade than unforced and the stalks are more tender and sweeter.

Root Crops

Small, early sowings of carrots, turnips, beetroot, and radish can be made as soon as soil and weather are favourable. Seedlings make poor growth in cold, wet soil and it is best to delay sowing if conditions are not favourable; sowings made a little later, when conditions are better, usually come to maturity at least as quickly and the loss caused by adverse conditions is much less. A light, easily worked soil is preferable for early crops. It should be well drained and rich in organic matter but not recently dressed with fresh organic manure.

For small sowings drainage can be improved and soil temperatures raised by making a raised bed or sowing on ridges. Sowing on a ridge is usually simplest and most effective, as at this time of year the soil does not usually dry out excessively.

Seed can be sown ¼in. to ½in. deep, according to whether the soil is heavy, moist, and cold or light, dry, and warm. Rows are usually 12in. apart, though about 8in. is sufficient for the smaller varieties of radish. If seed is sown thinly in well-worked, free soil, radish need not be thinned and carrots can be left until the thinnings are large enough to be used in soups and stews.

Beet is a rather sensitive crop and temperatures should be reasonably high or there is likely to be a high percentage of plants that run to seed. If plants are exposed for a month at temperatures of 40 to 50 degrees F., they are likely to seed the first year; even growing them at temperatures of up to 60 degrees F. is likely to produce seed heads the first year, though the plant is a biennial, normally producing its seed head in the second year. Early sowings are therefore usually confined to the flat, deep oblate, or round types, which are harvested early.

Early varieties of beetroot are best thinned to about 2in. apart, as otherwise the plants tend to grow lopsided. Turnips, too, are usually best thinned to about 2in. apart.

Some quick-maturing varieties suitable for sowing are:—

Carrot: Early Horn.

Turnip: Early White Milan and Early White Stone.

Beetroot: Flat Egyptian and Early Wonder.

Radish: French Breakfast and White Icicle.

Silver Beet and Spinach Beet

Though caution must be exercised in sowing any seed in July silver beet and the closely allied spinach beet are among the most suitable plants for early sowing. The soil should be well drained and cultivated and enriched with well-rotted organic material such as stable or farmyard manure.

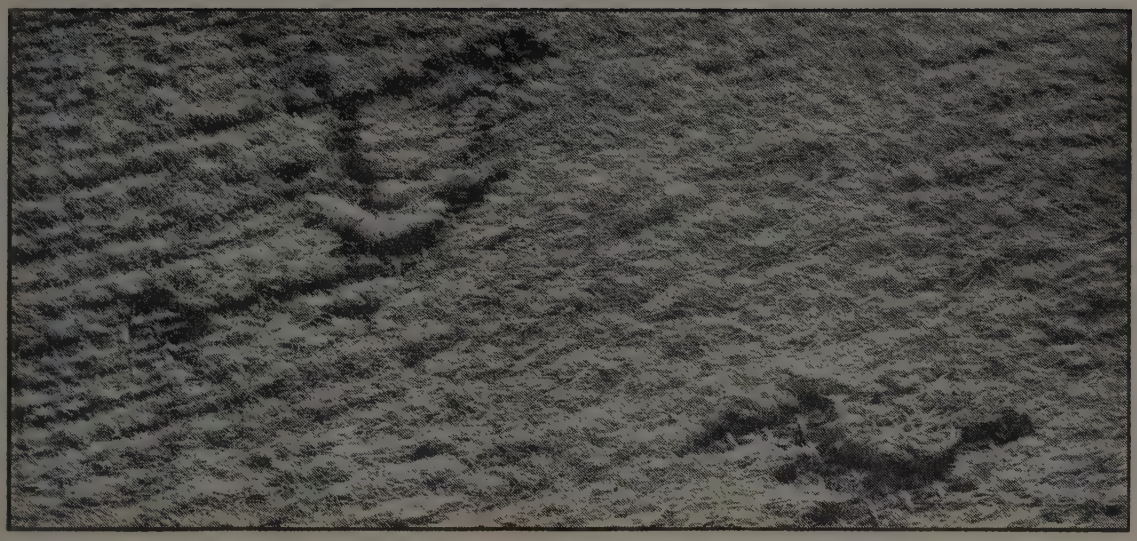
Outside sowing will usually be confined largely to favoured areas or to northern districts, but elsewhere it is a good plan to make a sowing under cloches or in a box placed in a frame. No time is then lost and when planted out the seedlings should not be less forward than those that were sown outside in more favoured districts.

Spinach

Like silver beet or spinach beet, spinach is one of the hardier vegetables. It can be sown throughout winter in well-drained and cultivated soil that is not too heavy, provided the seedlings can establish themselves without danger of being lifted by frost. As quick growth is essential to the production of good-quality produce, soil should be rich in well-rotted organic manure.

Vegetable Garden Guide

A very wide range of information on the culture of all vegetables likely to be grown in New Zealand is given in the Department of Agriculture Bulletin No. 342 "The Home Vegetable Garden". The bulletin, which is available from main offices of the Department at 4s., should prove particularly useful to inexperienced gardeners who are making preparation now for their first season.



Carpet Beetle Damage in New Zealand

MANY housewives when looking at damage to contents of a wardrobe or the edges of a carpet when dusting around skirting boards have immediately thought of moths as being responsible for it. In this article R. G. Montgomery, Sheep and Wool Instructor, Department of Agriculture, Hastings, shows that there is ample evidence that the common carpet beetle either *Anthrenocerus australis* or *Anthrenus verbasci* is widely spread throughout New Zealand and responsible for very considerable damage to woollen fabrics, other materials, and furnishings.

MOTH damage to woollens is normally assessed at a high annual total, but there appears to be strong evidence to suggest that the moth larvae, troublesome as they are, have been blamed for damage done by the carpet beetle. The adult carpet beetle is so small and so seldom seen that its presence is often unsuspected.

Adult of *Anthrenocerus australis* (after Evans).

Dr. E. G. Carter, of the London office of the International Wool Secretariat, says the carpet beetle blamed for most domestic infestations in Britain is *A. verbasci*, and *A. australis* has been found only in mills, in particular those manufacturing haircloth and bristles.

Larvae taken from a carpet in a Napier home and held until the adult beetles emerged were identified at Cawthron Institute as *A. australis*. Beetles taken from another home were *A. verbasci* and *A. australis*; those taken from a flower garden were identified as *A. verbasci*. The damage is done by the larvae, which change into tiny black or blackish grey beetles which take wing and eventually enter houses to lay eggs.

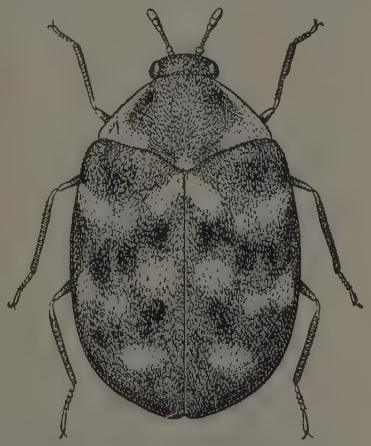
Fuller recognition of this widespread pest may produce some effective control or at least end the period of comparative ease in which the common carpet beetle goes through its destructive life cycle.

Development Cycle

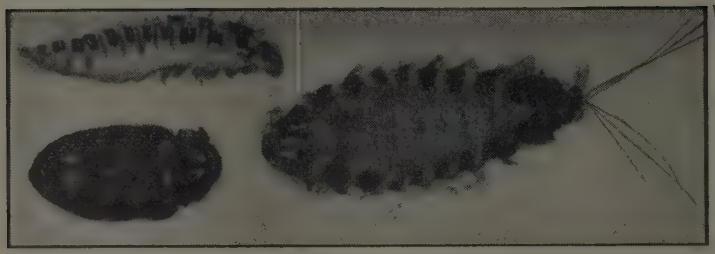
Larvae, later identified as *A. australis*, which were taken from a household carpet in August 1954 were placed in freshly scoured wool and the adult beetles emerged in early November. The beetles were held in the original container and early in January 1955 minute larvae were observed, apparently from eggs laid by the beetles. It is difficult to state exactly when the larvae hatched, as they are very minute and were only observed because of comparatively long and characteristic tail hairs.

In late September 1954 adult carpet beetles were found in another home. They were discovered on an ivory-coloured window ledge in considerable numbers. Other darker and stained window ledges were examined, but only an odd beetle was found.

On November 1954 what appeared to be carpet beetles were noticed settling on certain flowers in a garden. Samples of these beetles were collected



Adult of *Anthrenus verbasci* (after Hinton).



Stages in the development of the carpet beetle. Top left—Larva or "buffalo bug". At this stage the insect damages fabrics. Bottom left—Adult beetle. Right—Beetle emerging from pupal skin.

and later were identified at Cawthron Institute as *A. verbasci*.

Flight Stage of Beetle

The adult carpet beetles discovered in large numbers in the flower garden could be found on only two varieties of flowers in a well-stocked and varied garden. The flowers in the garden were fresh and damp from an early morning shower. A light-cream peony rose was first noticed to be well covered by beetles. An extensive search of the garden showed a big hydrangea bush with whitish flowers to have hundreds of beetles on it. In that well-stocked garden the beetles were found only on whitish hydrangeas and light-cream peony roses and on those in profusion.

Larvae apparently take 2 years to develop on a woollen diet (J. W. Evans, Department of Agriculture, Tasmania), but that life cycle can be reduced to a year where insects, fish meal, or some such animal matter is provided as food. According to Evans the carpet beetle is responsible for much more damage in houses than the clothes moth. More recent work done by Phyllis L. Robertson of the Entomological Research Station, Nelson, states that "According to present knowledge of *A. australis* in New Zealand, the species is probably much more widespread in New Zealand than it is in England, and in fact may approach the status it has attained in Australia as one of the most injurious household pests attacking fabrics".

Beetle Identification

The adult carpet beetle *A. australis* is blackish and so small that household identification without magnification is very difficult. The beetle is about 1/10in. to ⅛in. long and magnified has a scarab like shape. The black hairy back is broken by light patches and is covered with white or yellowish white hairs running in zig-zag pattern. *A. verbasci* is almost the same size, but is lighter in colour and not hairy. Scales form a variegated pattern over the back.

The larvae are about ⅛in. to 3/16in. long. They are fawn to brown on top with whitish undersides. The body appears segmented and covered with fine hairs, having a prominent hairy tuft protruding at the tail. The larvae are rather quick in movement and as they move the white under colour shows through the dark back joints to give the effect of fine white bands.

Habits

The beetle normally enters houses only to lay eggs. It breeds in obscure cracks and crevices. A favourite place is just under the skirting board alongside a carpet. The larvae or grubs will feed on carpet pile, furniture coverings, and woollen and other fabrics. Carpets are a favourite haunt of egg-laying beetles and consequent larvae, and it has been found that where edges are left free it is easier to make frequent examinations and apply remedial measures.

These pests do not confine their attention to houses. They are to be found among many types of stored material and are recognised as pests in many New Zealand woollen mills; larvae have also been found on recently imported goods.

Control

Carpet beetles are difficult to control efficiently, as they frequently attack fabrics liable to damage by sprays having either an unpleasant odour or an oil base; they attack clothing, where they cannot be eradicated by sprays or dust that may be irritants to human skin; they breed in obscure cracks and corners that are often difficult to reach, and, as household pests, cannot normally be subjected to complete fumigation. Control measures could include two principal forms of attack, particularly for carpets and floorings.

1. When wall to wall carpet is fitted it should not be permanently tacked down close to the skirting boards. Where it is necessary to fix a carpet in place it should be done in such a way that it can be conveniently undone to allow for cleaning along and under the edge with a vacuum cleaner, care being taken to clean thoroughly where the skirting board meets the floor and carpet edge, as that is a favourite breeding ground.

2. Carpets should be sprayed, particularly the edges, with a non-staining certified D.D.T. emulsion spray. This procedure should be routine household practice, particularly during October and November, when it appears that the beetles are entering houses to lay eggs.

Where sprays are used it is essential that the user take precautions against stain, as spray that can safely be used on a dark carpet may discolour a light material. A trial application would be a commonsense procedure.

D.D.T. applied by spray is much to be preferred to D.D.T. powder, since D.D.T. is greatly reduced in efficiency when it is mixed with dust. Naphthalene crystals and paradichlorobenzene are usually considered to be effective only if used in hermetically closed spaces where full vapour pressure can be built up. They are therefore not much good sprinkled in the corners of a room or in drawers.

Present work done with D.D.T. and lindane emulsion (certified) sprays on carpets is showing promising results.

According to information received from the Plant Diseases Division, Department of Scientific and Industrial Research, D.D.T. kills the beetles, but as the beetles live outdoors and enter houses only to lay eggs, control is only slight. D.D.T. is not effective against the larvae, but where D.D.T. is present the larvae do not feed.

Lindane is apparently more toxic to larvae, but as it has only slight residual activity, its usefulness is limited. Lindane may show better results if used during the December-January hatching period.

The most important aspect of house control is hygiene. Carpets and upholstered furniture should be regularly and thoroughly vacuum cleaned, particular care being taken to lift the carpet edges where the carpet meets the wall and to clean under the edges and along the floor at the bottom of the skirting board.

The fact that the beetles are on the wing in early November should assist control. As yet it has not been definitely established whether the beetles deposit their eggs by early November or are about to lay them and whether they settle in the flower garden before or after laying. Further information on this point is necessary, because a very extensive kill of adult beetles would be a very simple matter in the flower garden. Meanwhile peony roses and hydrangeas at least would bear inspection from October on and destruction of the beetles by the use of spray would be very advisable.

Within a few days five homes were visited where the housewives remarked that though they had had no trouble with carpet beetles, there was a little "moth" damage along the edges of carpets. In all five cases the damage was examined and found to be carpet beetle damage.

The Versatile Scone Recipe

By EVELYN E. MOORE, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

HOT scones are a favourite with most families, and indeed are a regular feature of the morning tea break in many farm homes. Yet however popular plain, hot buttered scones may be with the family a change of menu is usually welcomed, perhaps especially by the housewife if the new recipes are simple and easily followed. For this reason a variety of other uses for the versatile, quickly prepared scone mixture, not only for morning or afternoon teas, but also for savouries, desserts, and as accompaniments to the main meat course of a meal, are set out in this article.

THE basic recipe given is only one of many popular scone recipes, because the secret of good scone making lies as much in the mixing and baking as in the proportions of ingredients. Consequently the variations suggested can be used equally well by those who prefer to use their own recipe for scones instead of the one given.

Basic Recipe for Scones

8oz. of flour	½ teaspoon of salt
3 teaspoons of baking powder	2 tablespoons of butter
½ teaspoon of cream of tartar	¼ pint of milk

(All measurements of ingredients are level)

Sift together the dry ingredients and rub in the butter until the mixture has a texture resembling that of coarse breadcrumbs. If desired, two knives can be used to cut in the butter. Add the milk quickly, mixing the dough with a knife until it is very soft, but not wet. A little more or less than ¼ pint of milk may be required, depending on the quality of the flour. Turn the dough out on to a very lightly floured board. If a smooth even crust and flaky texture are desired, knead the dough very lightly by folding it and pressing it down with the palm of the hand about 8 or 10 times. If a more spongy texture is desired, do not knead the dough. Roll or pat it out to a thickness of approximately ½in.; scones thicker than this tend to develop hard, crusty tops, as they take longer to cook properly. Cut the scones out into squares or rounds and bake them on an ungreased, lightly floured tray in a hot oven (450 degrees F.) for 10 to 15 minutes. (This recipe makes about 10 scones.)

Variations

Scones are usually made with plain white flour, but it can be combined with other types of flour, such as wholemeal, or with bran, cooked mashed potato, or oatmeal to add variety and flavour.

Baking soda and cream of tartar, tartrate baking powder, or phosphate baking powder may be used as the raising agent. Too much baking soda or baking powder causes a bitter after-taste, which can be avoided by using slightly less baking powder and adding a small quantity of cream of tartar.

The liquid used may be fresh or sour milk, buttermilk, cream, or water if necessary, or dried milk may be sifted with the flour and water used to mix the scones. When sour milk or cream is used the quantity of raising agent should be adjusted, to allow for the acid in the milk or cream, to 1 teaspoon of baking soda and 1 to 1½ teaspoons of cream of tartar. Eggs may be used as part of the liquid, sugar may be added for sweet scones and scone desserts, and many other sweet or savoury ingredients can be added.

Scones may be baked in the oven, cooked on a girdle, fried in hot fat, or steamed (dumplings). Following are recipes showing a few of the ways in which the basic recipe can be easily altered.

Fruit Scones

Add ¾ cup of either raisins, sultanas, coarsely chopped dates, or other dried fruits or a mixture of them. Add the dried fruits before adding the milk or roll or pat out the scone dough, cover it with a layer of dried fruit, fold the dough in halves and roll it out again to the desired thickness, cut out, and bake.

Pinwheel Scones

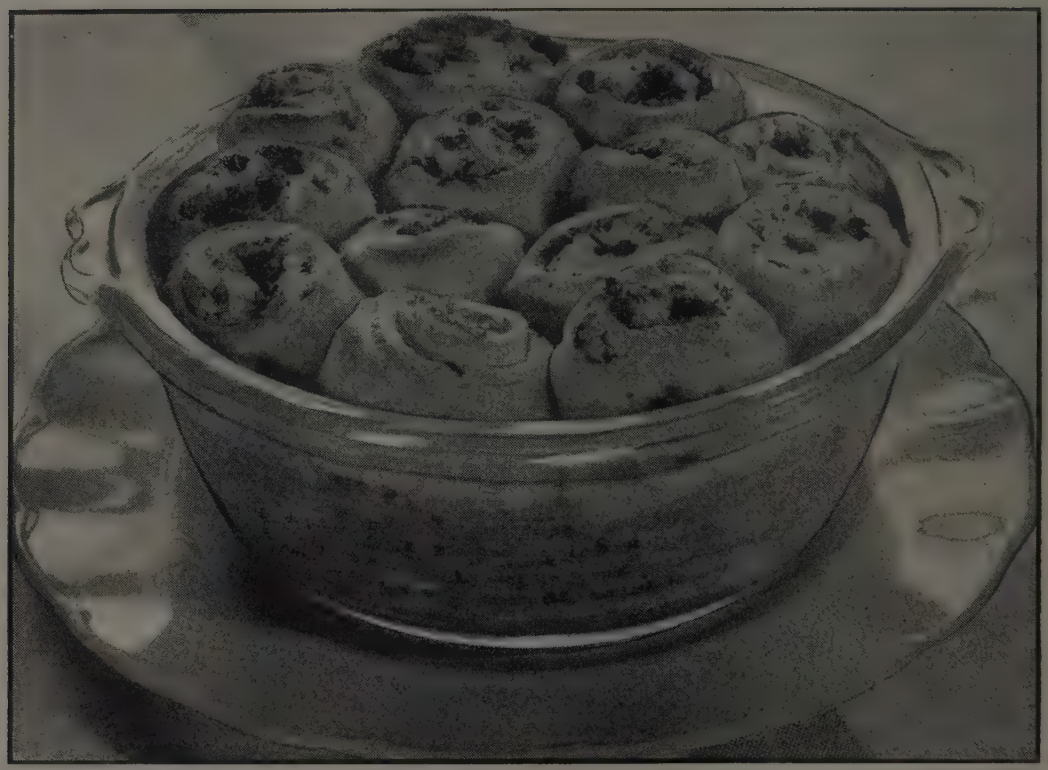
Additional ingredients are 2 teaspoons of melted butter, ¼ cup of brown sugar, and 1 to 3 teaspoons of cinnamon.

Roll the scone dough into a rectangle ¼in. thick, brush with melted fat, sprinkle with sugar and cinnamon, and roll up from the long side. Cut in ½in. to ¾in. slices and bake at 450 degrees F. for 15 to 20 minutes.

Alternative fillings for pinwheel scones are:—

1. ½ cup of brown sugar, 2 tablespoons of butter, and ¼ cup of raisins. Cream the butter and sugar, add the raisins, and spread the mixture on the rolled out dough.

2. Brush the rolled out dough with butter and sprinkle with grated cheese.



Savoury pinwheels used as crust on a shepherd's pie. [Sparrow

Orange Scones

Add to the standard recipe 1 tablespoon of butter and 1 tablespoon of sugar. Prepare, roll, and cut out the scones and make a slight depression in the centre of each one.

Mix the grated rind of an orange with 2 tablespoons of sugar and moisten it with orange juice. Fill the hollow in each scone with about 1 teaspoon of orange sugar before cooking.

Rusks

Add 1 tablespoon of fat to the standard recipe and substitute 1 beaten egg for part of the milk. Mix the dough to the consistency of a soft scone dough, roll or pat it out to approximately ¼in. thick, and cut it into scones of the desired size. Bake the scones and split them with two forks. Return to the oven and continue baking in a slow oven (300 degrees F.) until the scones are crisp and golden brown. These keep well in an airtight tin. They are served buttered for morning and afternoon teas.

Sugar and Spice Squares

To the basic recipe add 1 tablespoon of butter, 4oz. of sugar, ½ cup of raisins, and 1 egg.

Beat the egg and add it to the milk. Mix to the consistency of a drop scone dough. Turn the mixture into a greased baking pan approximately 8in. square and 2in. deep. Sprinkle it with a topping made by creaming together ¼ cup of brown sugar, 1 teaspoon of cinnamon, and 1 tablespoon of melted butter. Bake at 400 degrees F. for 20 to 25 minutes. It may be cut into squares when cold or sliced and buttered and served as a tea cake.

Wholemeal Scones

Substitute 1 cup of unsifted wholemeal flour for 1 cup of white flour in the basic recipe and increase the salt to ¾ teaspoon.

Wholemeal, Honey, and Raisin Scones

Roll wholemeal dough out to a thickness of ¼in. and cut it out in circles or squares. Cream together ½ cup of softened honey, 2 tablespoons of butter, and ½ cup of chopped raisins. Spread a teaspoon of the mixture on each of half the circles. Cover with the remaining circles, pinch the edges together firmly, and bake as directed for plain scones.

Corn Scones

Increase the salt in the basic recipe to 1 teaspoon. Reduce the milk to ¾ cup approximately and add ¾ cup of drained, tinned sweet corn to the milk. Mix, roll out, cut up, and bake as directed for plain scones.

Served hot these scones can be used for party savouries.

Savoury Scone Recipes

Savoury dumplings, either baked or steamed, especially when they are really light and fluffy, are attractive additions to stews and casseroles on wintry days. They are economical, too, as they can make a stew go almost twice as far.

They may be baked on top of an uncovered casserole in the oven or steamed. In either case the liquid of the stew must be boiling gently when they are added, and steamed dumplings must be tightly covered. Cooking in a pressure saucepan with the pressure control removed or adjusted to 5lb. pressure will ensure light, fluffy dumplings. It is most inadvisable to remove the lid of the saucepan while they are cooking. Seasonings may include chopped parsley, corned beef or ham, grated cheese, chopped cooked bacon, chutney, minced onions,

or sliced cooked sausages. They may be mixed with tomato juice or dissolved meat or vegetable extract instead of with milk.

Dumplings

Increase the milk in the basic recipe to ¾ cup or slightly more if dumplings of a "drop" scone dough consistency are required. Increase the baking powder to 4 level teaspoons and the butter to 2oz. (optional). One beaten egg may be added if desired instead of extra milk.

Mix according to directions for the basic recipe, drop the dough in spoonfuls on to a bubbling stew, and cook with the pot closely covered for 12 to 15 minutes. If there is too much liquid in the stew, remove some so that the dumplings do not sink right into it but rest lightly on top of the meat and vegetables. Alternatively they may be baked, uncovered, on top of a simmering casserole for 12 to 15 minutes in a moderately hot oven (400 degrees F.).

Parsley Dumplings

Add ¼ cup of chopped parsley to the dry ingredients before mixing.

Onion Dumplings

Add ¼ cup of chopped onion, browned in a little bacon fat, to the dry ingredients.

Savoury Pinwheels

To the basic scone recipe add 1oz. of butter or lard. Mix to the consistency of a soft scone dough and roll out into a rectangle ¼in. thick. Mash 5oz. of luncheon sausage with 1 teaspoon of Worcester sauce, 1 teaspoon of mixed mustard, and 1½ tablespoons of salad dressing. Spread the mixture over the dough, roll it up, and cut it into slices ½in. thick. Bake the pinwheels in a hot oven (450 degrees F.) for 15 minutes. Serve them hot.

[*Sparrow*

Rusks made with a variation of the scone mixture.

Minced ham, parsley seasoned with salt and pepper, grated cheese mixed to a thick paste with salad dressing, or any other savoury mixture may be used instead of luncheon sausage.

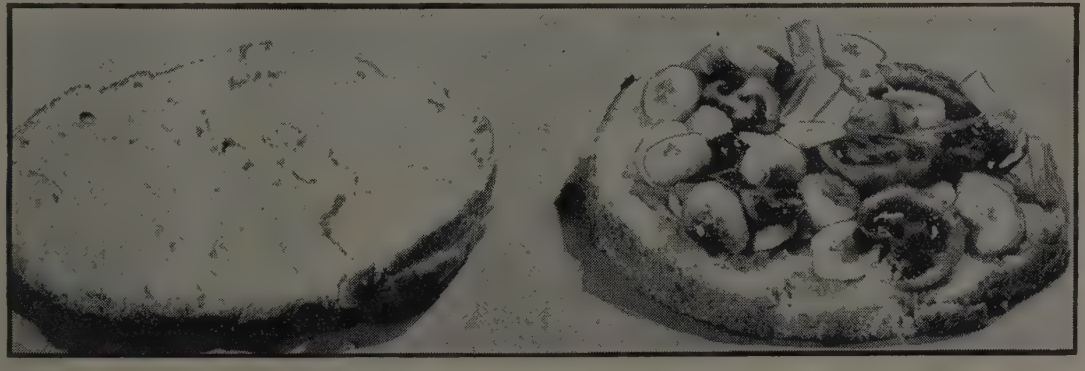
The pinwheels may also be baked on top of a casserole stew or substituted for mashed potatoes on top of shepherd's pie.

Filled Scones

Instead of the dough prepared for savoury pinwheels being spread with the filling it may be cut into rounds with a pastry cutter. Half the rounds are spread with melted butter and approximately a teaspoon of the savoury mixture is placed on top. The remaining rounds are placed on top of the savoury mixture and pressed down firmly around the edges. They are then baked and served hot in the same way as savoury pinwheels.

Desserts

Steamed and baked puddings with a scone mixture base are quickly made and can be tasty and appetising as well as satisfying and warming on wintry days. To produce a light spongy texture the mixture must be sufficiently moist—similar to that for scones.



Shortcake filled with banana and tree tomato mixture.

Everyone wants a new

FRIGIDAIRE

REGISTERED TRADE MARK

First choice the world over!

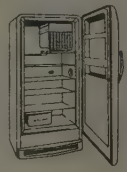
Despite the tremendous production capacity of General Motors the demand for "Frigidaire" household appliances at present exceeds the supply. To wait, however, is well worthwhile, for with a "Frigidaire" refrigerator, electric range or food freezer you can be completely confident that you are buying modern design, sound engineering, the utmost dependability. You are buying—in a word—***quality*** . . . quality assured by General Motors' long experience and unequalled research and production progress.

FRIGIDAIRE 7.7 cu. ft. De Luxe Refrigerator.

FRIGIDAIRE were first with a full-width American-type Super Freezer Chest. Holds up to 50 lbs. of frozen foods at freezing temperature. Also: full-width Chill Drawer, holding a week's supply of flat cuts of meat; convenient Door Shelves for eggs bottles, etc.; "Quick-ube" Ice Trays; Hydrator for vegetables; adjustable Cold Control; "Meter-Miser" economy.

7.9 cu. ft. Refrigerator

For the larger family. Large Super Freezer, convenient easy-to-reach door shelves, "Quick-ube" ice trays, vegetable hydrator, "Meter-Miser".



5.5 cu. ft. Refrigerator

For the smaller family. Large Super Freezer, "Quickube" ice tray, vegetable hydrator, adjustable cold control "Meter-Miser" economy.

Home Food Freezer

Buy when prices are low, freeze and keep food fresh for months. Holds up to 326 lbs. of frozen foods, in convenient storage baskets. "Meter-Miser".

FRIGIDAIRE Electric Ranges

FRIGIDAIRE introduced "automatic cooking" to New Zealand with these ultra-modern Electric Ranges. Sensational "Cook-Master" switches oven on and off at any set interval—while you're in or out. Other features: "Radiantube" Surface Elements, providing 5 fast economical heats; thermostat oven control; two oven elements; warming drawer; appliance outlet; choice of four models.

GM GENERAL MOTORS

Distributed by

FRIGIDAIRE

Division of

General Motors New Zealand Limited

Refrigerators, Home Food Freezers operate with "METER-MISER" ECONOMY

The simplest refrigerating unit ever built, the exclusive "Meter-Miser" maintains "safe cold" on a mere trickle of current, with plenty of reserve power for hot days. Actually costs less to run than an ordinary light bulb. A sealed unit, oiled for life, it carries a 5-year guarantee.

Through a New Zealand-wide Network of Authorised Dealers.

Fruit Roly Poly

Make the basic scone mixture. Mix and roll the dough into a rectangle about ¼in. thick. Spread it fairly thickly with sliced apples, peaches, or other fruit, and sprinkle sugar and a little cinnamon over them. Roll up the dough, pressing the ends well together so that the fruit cannot escape. Tie the mixture loosely in a cloth and steam in a steamer over boiling water for 1½ to 2 hours or bake it in a moderately hot oven for 35 to 40 minutes. (Six servings.)

Jam Layer Pudding

Prepare the basic recipe of scone mixture with 1 egg replacing some of the milk. Roll the dough ¼in. thick and cut it into circles to fit the basin in which it is to be cooked. Grease the basin well and cover the bottom with a layer of a dark coloured jam. Place a layer of scone mixture on top, then a layer of light coloured jam, then another layer of scone mixture, and so on alternately until the basin is two-thirds full. Cover tightly and steam for 1½ to 2 hours. (Six servings.)

Fluffy Dumplings in Syrup

To the basic scone recipe add 1 egg; slightly less milk may be required. Mix to the consistency of a drop scone dough. Drop in spoonfuls into a boiling syrup made by combining 1 cup of boiling water, ¼ teaspoon of lemon rind, 1 teaspoon of lemon juice, and ½ cup of golden syrup, honey, treacle, jam, or jelly.

Cover the saucepan closely and boil very gently for 15 minutes. (Six servings.)

Steamed Apple Pudding

Prepare the basic recipe of scone mixture. Roll out the dough to slightly less than ½in. thick.

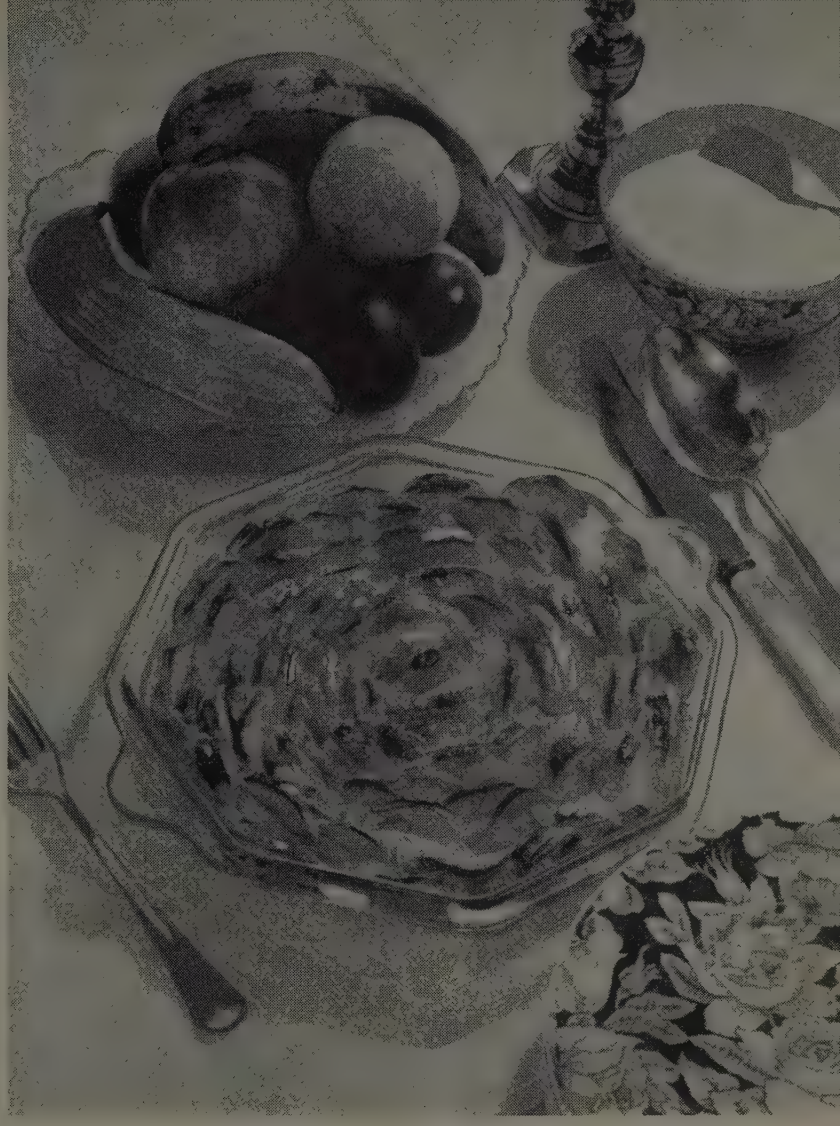
Additional ingredients are: 4 apples (peeled and sliced), 1 tablespoon of sugar, ¼ teaspoon of salt, and ¼ teaspoon of nutmeg.

Place the sliced apples in the middle and sprinkle with the flavouring. Fold the dough over the apples and lift it into a buttered mould. Steam for 1½ hours. Serve with vanilla or hard sauce. (Six servings.)

Peach Cobbler

Use the basic recipe of scone mixture and 1 well-beaten egg, ⅜ cup of sugar, 2 cups of sliced peaches (cooked), and ¼ cup of butter.

Mix the egg, sugar, and peaches. Spread them in the bottom of a buttered baking dish. Dot with butter and cover with the scone dough, previously patted out to fit the shape of the baking dish. Bake in a hot oven (450 degrees F.) for 15 to 20 minutes. (Six servings.)



Apple cake made with a shortcake recipe. [*Sparrow*

Shortcake

8oz. of flour
3 teaspoons of baking powder
1 tablespoon of sugar
2oz. of butter
½ teaspoon of salt
¼ pint of milk

If a richer shortcake is desired, reduce the milk to ⅓ cup and add 1 egg (well beaten), 1 tablespoon of butter, and 3 tablespoons of sugar.

Mix according to the scone method; that is, sift the flour, salt, and baking powder, add the sugar, rub in the butter, and mix to a soft scone dough with the liquid ingredients.

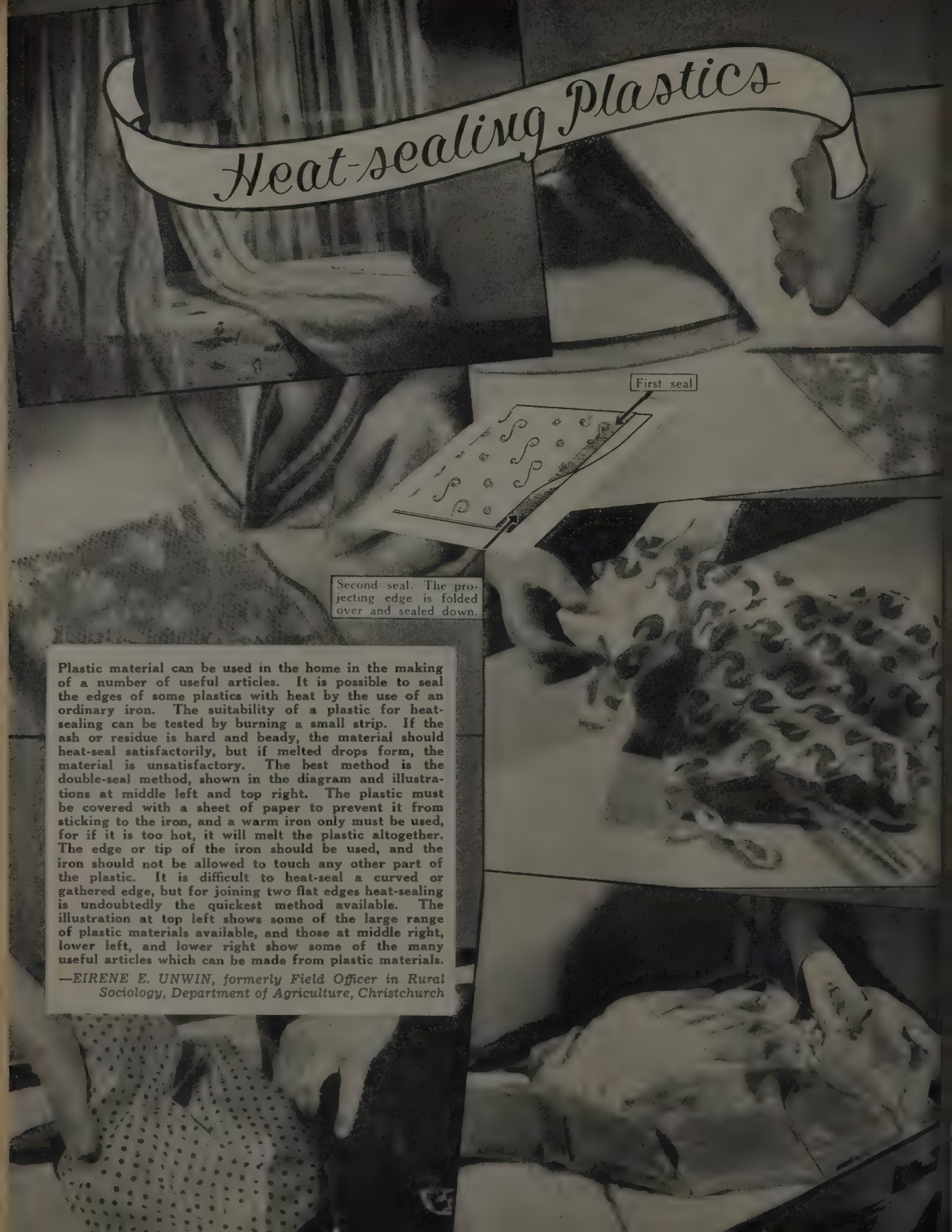
Divide the dough in halves and pat or roll it out into two circles to fit the tin they are to be baked in. Place one in the bottom of the greased tin, brush it with melted butter, and place the other round on top. Bake in a moderately hot oven (400 degrees F.) for 20 to 25 minutes or bake the shortcakes in individual tins for 15 minutes.

Split the two rounds apart with a fork and spread with butter. Spread raw or cooked fruit between the layers and on top. Serve with cream. (Six servings.)

Apple Cake

Prepare one of the above recipes for shortcake. Spread the mixture ¾in. thick in a greased round or oblong cake tin or other baking dish. Peel and core 2 or 3 cooking apples and cut them into slices. Press the sharp edges of the apples closely together in the dough in parallel rows. Sprinkle the apples with a mixture of ½ cup of sugar and ½ teaspoon of cinnamon. Bake in a moderate oven (350 degrees F.) for 40 minutes. (Six servings.)

Heat-sealing Plastics



Plastic material can be used in the home in the making of a number of useful articles. It is possible to seal the edges of some plastics with heat by the use of an ordinary iron. The suitability of a plastic for heat-sealing can be tested by burning a small strip. If the ash or residue is hard and beady, the material should heat-seal satisfactorily, but if melted drops form, the material is unsatisfactory. The best method is the double-seal method, shown in the diagram and illustrations at middle left and top right. The plastic must be covered with a sheet of paper to prevent it from sticking to the iron, and a warm iron only must be used, for if it is too hot, it will melt the plastic altogether. The edge or tip of the iron should be used, and the iron should not be allowed to touch any other part of the plastic. It is difficult to heat-seal a curved or gathered edge, but for joining two flat edges heat-sealing is undoubtedly the quickest method available. The illustration at top left shows some of the large range of plastic materials available, and those at middle right, lower left, and lower right show some of the many useful articles which can be made from plastic materials.

—EIRENE E. UNWIN, formerly Field Officer in Rural Sociology, Department of Agriculture, Christchurch

Girl's Neat and Comfortable Cardigan

WINTER cold will be no trouble to a girl wearing the warm and comfortable cardigan described in this article. Cable patterns down each side of the front centre are a variation. The garment can be made in any colour.

THE materials required are 10oz. of 3-ply wool, two No. 11 and two No. 13 knitting needles, spare short double-pointed needles for cable stitch, and nine buttons.

Measurements: Length, 19in.; bust, 33in.; sleeve seam, 17½in.

Tension: 8½ st. to 1in.

Abbreviations: K., knit; p., purl; st., stitch(es); st.st., stocking stitch; inc., increase; dec., decrease; rep., repeat, cont., continue; patt., pattern; beg., beginning; tog., together.

The Back

With No. 13 needles cast on 102 st. fairly loosely and work 5in. in st.st. (1 row k., 1 row p.), ending with a p. row.

Now make a hem in the next row thus:—

Next row: Fold the work in half with the wrong side inside and k. tog. 1 st. from needle and 1 st. from the cast-on edge all along the row.

Next row: P. 3, p. twice in next st., * p. 4, p. twice in next st. Rep. from * to last 3 st., p. 3 (122 st.).

Change to No. 11 needles and cont. in patt. thus:—

First row: K. 1, * k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 1, p. 6. Rep. from * to last 13 st., k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 2.

Second row: K. 1, * p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 6. Rep. from * to last 13 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1.

Third row: K. 1, * k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 1, p. 6. Rep. from * to last 13 st., k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 2.

Fourth row: K. 1, * p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 6. Rep. from * to last 13 st., p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 1.

Fifth row: K 1, * k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 7. Rep. from * to last 13 st., k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 2.

Sixth row: K. 1, * p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 7. Rep. from * to last 13 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1.

Seventh row: K. 1, * k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 1, p. 6. Rep. from * to last 13 st., k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 2.

Eighth row: K. 1, * p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 6. Rep. from * to last 13 st., p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 1.

Ninth row: K. 1, * k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 1, p. 6. Rep. from * to last 13 st., k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 2.

Tenth row: K. 1, * p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 6. Rep. from * to last 13 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1.

Eleventh row: K. 1, * p. 1, k. 1, (p. 2, k. 2) twice, p. 1, k. 7. Rep. from * to last 13 st., k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 2.

Twelfth row: K. 1, * p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 7. Rep. from * to last 13 st., p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 1.

These 12 rows form the patt.

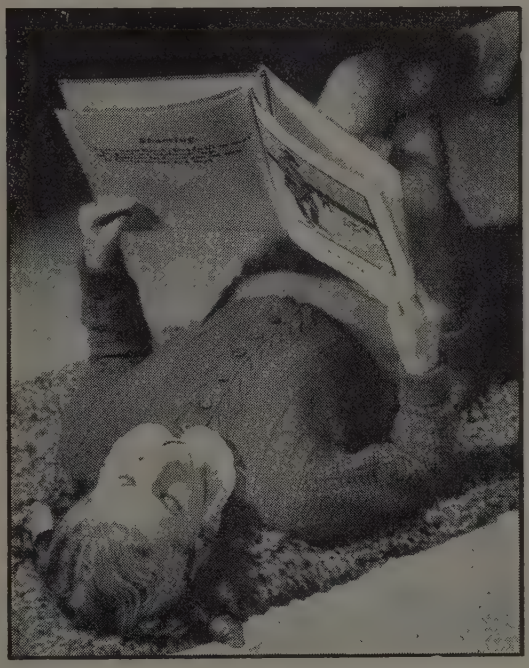
Cont. in patt., inc. 1 st. at both ends of next and every following sixth row until there are 140 st., working extra stitches into patt. Then cont. straight until the work measures 11in. from the lower edge.

Shaping the Armholes

Keeping continuity of patt., cast off 6 st. at beg. of next 2 rows, then dec. 1 st. at both ends of every row until 104 st. remain. Cont. straight until the work measures 19in. from the lower edge.

Shaping the Shoulders

Cast off 9 st. at beg. of next 6 rows, then cast off 8 st at beg. of next two rows. Cast off remaining stitches.



The Right Front

With No. 13 needles cast on 48 st. fairly loosely and work 5in. in st.st., ending with a p. row. Now make a hem in the next row in the same way as given for the back.

Next row: * (p. 2, p. twice in next st.) twice, p. 3, p. twice in next st. Rep. from * to last 8 st., (p. 2, p. twice in next st.) twice, p. 2 (62 st.).

Change to No. 11 needles and cont. in patt. with cable front border thus:—

First row: K. 1, p. 1, k. 10, p. 1. Rep. from * as in first patt. row (as given for the back) to the end.

Second row: K. 1, rep. from * as in second patt. row to the last 25 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

Third row: K. 1, p. 1, k. 10, p. 1. Rep. from * as in third patt. row to the end.

Fourth row: K. 1, rep. from * as in fourth patt. row to last 25 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

Fifth row: K. 1, p. 1, slip next 5 st. on a spare needle and leave at front of the work, k. 5, now k. 5 from spare needle, p. 1, rep. from * as in fifth patt. row to the end.

Sixth row: Work as given for sixth patt. row to last 25 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

Seventh row: K. 1, p. 1, k. 10, p. 1. Rep. from * as given in seventh patt. row to the end.

Eighth row: Work as given for eighth patt. row to last 23 st., p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

Ninth row: K. 1, p. 1, k. 10, p. 1. Rep. from * as in ninth patt. row to the end.

Tenth row: Work as given for tenth patt. row to last 25 st., p. 1, k. 1, (k. 2, p. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

Eleventh row: K. 1, p. 1, k. 10, p. 1, rep. from * as given in eleventh patt. row to the end.

638—GIRL'S NEAT CARDIGAN . . .

Twelfth row: Work as for twelfth patt. row to last 25 st., p. 1, k. 1, (p. 2, k. 2) twice, k. 1, p. 1, k. 1, p. 10, k. 2.

These 12 rows form the patt.

Cont. in patt., inc. 1 st. at end of next and every following sixth row until there are 71 st., working extra stitches into patt. Then cont. straight until the work measures 11in. from the lower edge, ending at the side edge (opposite edge to cable panel).

Shaping the Armhole

Cast off 6 st. at beg. of next row, then dec. 1 st. at armhole edge in every row until 53 st. remain. Cont. straight until the work measures 16in., ending at the front edge.

Shaping the Neck

Cast off 3 st. at beg. of next row, then dec. 1 st. at the neck edge in every row until 35 st. remain. Cont. straight until the work measures 19in., ending at the armhole edge.

Shaping the Shoulder

Next row: Cast off 9, work to the end. Next row: Work to end. Rep. these two rows twice more. Cast off remaining stitches.

The Left Front

Work as given for the right front until inc. row after hem row has been completed (62 st.).

Change to No. 11 needles and cont. in patt. with cable front border thus:—

First row: Work as given for first patt. row to last 25 st., k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 1, p. 1, k. 10, p. 1, k. 1.

Second row: K. 2, p. 10, k. 1. Rep. from * as in second patt. row to the end.

Third row: Work as for third patt. row to last 25 st., k. 1, p. 1, (p. 2, k. 2) twice, p. 1, k. 1, p. 1, k. 10, p. 1, k. 1.

Fourth row: K. 2, p. 10, k. 1. Rep. from * as in fourth patt. row to the end.

Fifth row: Work as for fifth patt. row to last 25 st., k. 1, p. 1, (k. 2, p. 2) twice, p. 1, k. 1, p. 1, slip next 5 st. on a spare needle and leave at back of the work, k. 5, now k. 5 from spare needle, p. 1, k. 1.

Sixth row: K. 2, p. 10, k. 1. Patt. to the end.

Seventh row: Patt. to last 13 st., p. 1, k. 10, p. 1, k. 1.

Eighth row: As sixth row.

Ninth row to twelfth row. Rep. seventh and eighth patt. rows twice.

These 12 rows form the patt. Cont. in patt., inc. 1 st. at the beg. of the next and every following sixth row until there are 71 st. Then cont. straight until the work measures 11in. from the lower edge, ending at the side edge. Shape the armhole and complete to match the right front.

The Sleeves

With No. 13 needles cast on 56 st. and work 5in. in st.st., ending with a p. row. Now make a hem in next row in the same way as before.

Next row: * p. 3, p. twice in next st., p. 4, p. twice in next st. Rep. from * to last 2 st., p. 2 (68 st.).

Change to No. 11 needles and cont. in patt. as given for the back, inc. 1 st. at both ends of third and every following eighth row until there are 106 st., working extra stitches into patt. Then cont. straight until the work measures 17½in. from the lower edge.

Shaping the Top

Dec. 1 st. at both ends of every alternate row until 68 st. remain. Now dec. 1 st. at both ends of every row until 48 st. remain. Cast off 6 st. at beg. of next six rows. Cast off remaining stitches.

The Neck Border

Join the shoulder seams. With the right side of the work facing and using No. 13 needles pick up and k. 120 st. evenly all round the neck edge. Work 1½in. in st.st., beg. with a p. row. Cast off fairly loosely.

The Front Borders

With No. 13 needles cast on 20 st. and work in st.st. for 16¾in. Cast off.

Using pins, place the button positions thus:—

Place one pin ½in. from cast-on edge and another pin ½in. from cast-off edge, then place 7 more pins at equal distances in between these 2 pins along the length of the border.

Now work the buttonhole border, placing the buttonholes by measuring against the pins thus:—

With No. 13 needles cast on 20 st. and work in st.st. until the work measures the same length as the first border to the first pin, ending with a p. row.

Next row: K. 3, cast off next 4 st., k. to last 7 st., cast off 4, k. to end.

Next row: P. 3, cast on 4, p. to last 3 st., cast on 4, p. 3.

Cont. in st.st., making further buttonholes in the same way until all buttonholes are completed. Work ½in. in st.st. Cast off.

The Make-up

Press the work lightly with a hot iron and damp cloth. Join the side and the sleeve seams and sew in the sleeves with seams to side seams. Fold the neck border in half on the wrong side and slip stitch neatly down. Sew the front borders to the front edges with the right sides facing together, then fold in half on wrong side and hem. Working through the double fabric, buttonhole stitch all round the buttonholes. Sew on the buttons. Press the seams.

Orange Baskets

TO make the orange baskets illustrated the ingredients needed are 4 oranges, 1 pint of milk, 2oz. of sugar, and 1½oz. of cornflour or custard powder.

Peel the rind of 1 orange thinly, put in a pan with three-quarters of the milk, heat but do not boil. Remove from the heat; cover and leave to infuse for 10 minutes.

Cut the other 3 oranges in halves and remove the pulp carefully with a sharp-pointed knife. Mix the cornflour or custard powder and sugar with the remaining cold milk, strain the flavoured milk free from the orange rind, bring to the boil, and pour over the blended cornflour, stirring well. Return to the pan and boil for 5 minutes, stirring all the time. Chop the orange pulp and add it to the mixture, then leave it to cool. Pour into the orange cups and, when cold, decorate with orange quarters from the peeled orange and piped mock cream. Handles for the baskets can be made from strips of angelica, or with thin strips of orange or apple peel. As an alternative to the milk jelly can be used.

Simple Alterations to Give Better Kitchen Cupboards

By ELEANOR COUSTON, Field Officer in Rural Sociology, Department of Agriculture, Christchurch

EASY accessibility is one of the criteria for any type of storage space and in the kitchen is one of the most important. Often one hears a housewife say "my kitchen has lovely cupboards", but an inspection may reveal rows of deep caverns, some too high and some too low, which involve many unnecessary movements to find the article required. A few women may have the opportunity of designing the perfect kitchen for themselves, others may be able to remodel, but most must make the best of what they have. Frequently improvements may be effected by rearrangement or some simple carpentry which will save both time and energy and prevent irritation which results from futile searching.

BEFORE improvements can be made it is necessary to be aware of the faults. It is easy unconsciously to become a martyr to inconvenience and to overlook latent possibilities. A few hours spent reorganising equipment and supply cupboards may save much wasted time and energy in the future. Anything which is never used should be discarded and things which are seldom used placed out of the way in the less accessible cupboards.

For Easy Access

Stooping, reaching, and stretching all contribute to fatigue, and adjustments should be made to eliminate unnecessary movements. When storage space is reorganised the first essential is to determine the area where the most frequently used goods should be stored.

The area which can be reached when the elbow is kept close to the side and the forearm moved round or up or down is the most accessible and should be reserved for supplies which are used daily. Other supplies which are used frequently should be stored within the areas which can be reached when, with the fingers bent, the arm is swung in a circle from the shoulder. Space above the highest point of this arc is dead storage space, and items which are required only occasionally should be stored here. The area between the floor and the lowest point of the arc is semi-dead storage space. For the average sized person, the standards which have been established for accessible storage lie within an area not higher than 6ft. nor lower than 1ft. from the floor.

Store Supplies where Used First

Though the arrangement of large equipment is important, the greatest factor for saving steps in a kitchen is the grouping of utensils and supplies close to the place where they are used first. For instance, all the ingredients and utensils necessary for baking and for packed lunches should be stored within easy reach of the preparation bench or table and close to the safe or refrigerator. When a large table holds pride of place in the centre of the kitchen, it can prove an obstacle and so also will a cupboard door which swings the wrong way. Rehanging a cupboard door from the opposite side may make the contents more accessible.

In the area surrounding the sink everything required for washing up, vegetable preparation, and garbage disposal should be stored. Vegetables and any other foods such as dried fruits which require soaking before cooking should also be kept near the water supply.

The most convenient place for china in everyday use is to the side of the sink so that no steps are necessary to replace it after washing up.

Close to the stove is the correct place for serving utensils, hot lids, frying pans, and serving dishes and also for the requirements for seasoning and gravy making. A cupboard is not necessary, but a shelf and wall hooks

At right—Deep, old-fashioned cupboards with widely spaced shelves waste space, are difficult to arrange, and cause fatigue.

The Answer to Cold Winter Days...

HOT STEAMED PUDDING
Served with delicious
EDMONDS CUSTARD SAUCE

Try this NEW recipe for

STEAMED PUDDINGS

FOUNDATION RECIPE:

3 ozs. Butter, 3 ozs. Sugar, 1 Egg, 6 ozs. Flour, Pinch of Salt, 1 heaped teaspoon EDMONDS BAKING POWDER, *1 teacup Milk (approx.)*

Cream butter and sugar, add egg and beat well. Add sifted dry ingredients alternately with the milk. Pour into a greased basin and steam 2 hours.

This pudding can be varied as follows:

JAM or RAISIN—Put 2 tablespoons of Jam or Raisins in bottom of basin.

DATE or FIG—Add 2 ozs. of chopped Dates or Figs to the mixture.

SULTANA or CURRANT—Add 2 ozs. Sultanas or Currants to the mixture.

COCONUT—Add 2 ozs. Coconut to the mixture.

MOCHA—Add 1 tablespoon Cocoa and 1 tablespoon Coffee Essence to the mixture.

CHOCOLATE—Add 1 tablespoon Cocoa to the mixture.

Serve with EDMONDS CUSTARD SAUCE

PRODUCTS OF T. J. EDMONDS LTD., CHRISTCHURCH, N.Z.

EXTRA FEATURES AT NO EXTRA COST!

Easyway WASHING MACHINES

STOCKISTS THROUGHOUT N.Z.

Manufactured by
SPEEDWAY PRODUCTS LTD.,
26 ALBERT STREET, AUCKLAND

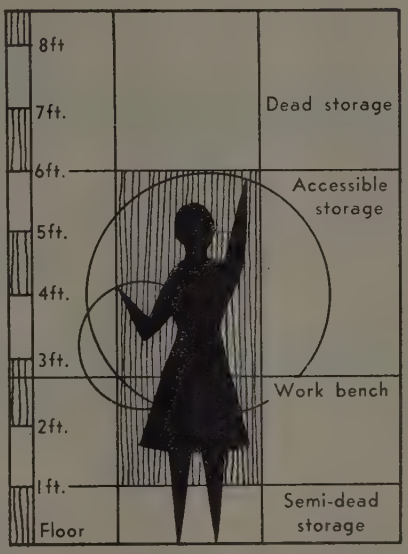
will accommodate many articles. It is sometimes wise to duplicate certain inexpensive items such as salt and pepper which may be required frequently at both the preparation and cooking centres.

Shelves to Fit Supplies

Deep cupboards with widely spaced shelves waste space and are difficult to arrange. The ideal is achieved when supplies are stored one row deep so that each packet, tin, or bottle is clearly visible. Both the width of the shelf and the space between should be determined by the size of the articles to be stored. Where deep cupboards with waste space between the shelves are already installed, some simple alterations will increase their efficiency.

Storing China

The principles already mentioned should be applied to the storage of china, and only pieces of the same size and kind stacked together. Many china cupboards consist of two widely spaced shelves, and bread and butter, savoury, and dinner plates are stacked one on top of the other. This necessitates lifting the top plates each time the larger size is required. Extra shelves placed between the existing ones will make it possible to store like things together.



Items most frequently used should be stored in the most accessible area.

Cups may be stacked in groups of two, but are better in single rows. Narrow or half shelves are adequate for cups and tumblers.

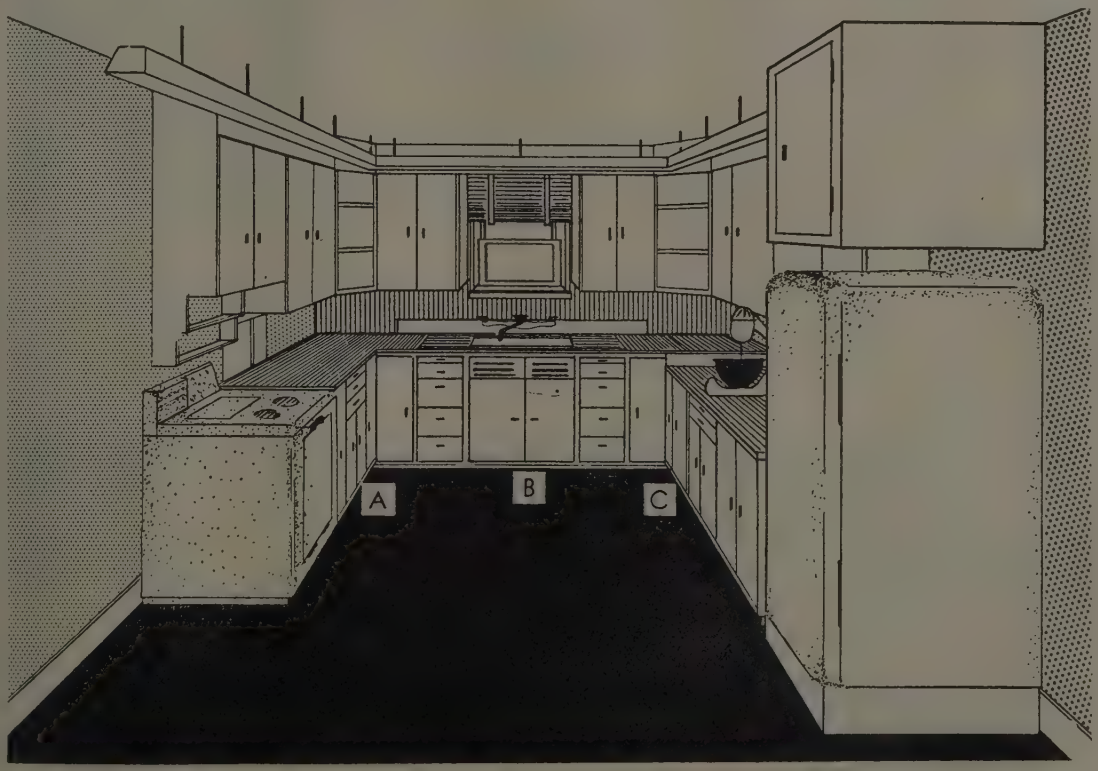
Meat ashets and vegetable dishes should have their own compartments.

Stepped Shelves

Small tins, bottles, or jars may be brought clearly into view by placing them on stepped shelves. These shelves can be any length or width desired and can be placed in a deep cupboard to increase the amount of useful storage.

Hanging Shelves

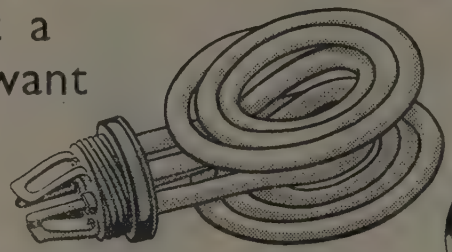
Another simple way of reducing waste space is by the use of

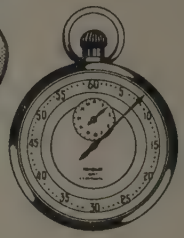


To save steps food and utensils should be stored where they are first used. A—Store near stove: Frying pans, serving utensils, saucepan lids, oven cloths, meat dishes, fat, flour, and seasoning. B—Store near sink: Everyday china, everyday silver, knives, peelers, clean tea towels, dish drainer, colander, saucepans, soap, dish mop, scourer, garbage can, potatoes, onions, and foods requiring soaking. C—Store near mixing bench: Mixing bowls and flour sifter, rolling pin, measuring cups and cake and patty pans, trays, flour, sugar, shortening, spices, seasonings and essences, cornflour, baking powder, etc.

Speed-Speed-Speedee!

When you want a cup of tea, you want it—fast!





Speedee

All records broken for fast water boiling

DOUBLE X JUG ELEMENT

(Patent applied for)
(Provisional Patent No. 111149)

FIT IT YOURSELF—You can do it in a few minutes.

If you cannot secure a Speedee Double X Jug Element write to H. C. Urlwin Ltd., Waltham Road, giving your dealer's name.

GET YOURS NOW PRICE **21/-**

Your Speedee Double X has **two** elements in one. It's the fastest known way to boil water. And if one element goes, the other carries on.

The Speedee Double X Jug Element is a further development of H. C. Urlwin Ltd., the originators of the Tubular Jug Element for faster boiling.

4 YEARS' GUARANTEE

H. C. URLWIN LTD.

Waltham, Christchurch.

For bounding day-long vitality!

They're a real food — packed with red meat, bone, fat and important food elements. Available in 1¼ lb. and 2½ lb. packets, 28 lb. and 56 lb. bags from stock and station agents, chemists and storekeepers.

BONNY

DOG BISCUITS

Manufactured by Bonny Products, Lombard Street Palmerston North, and distributed by Salmond and Spragson Ltd. Wellington. 1.4

For Comfortable Winter Travel

. . . GO BY TRAIN!

★

You'll enjoy the relaxation—the freedom from travel strain and worry—when you go by train or railcar! All long-distance trains are steam-heated during the winter months.

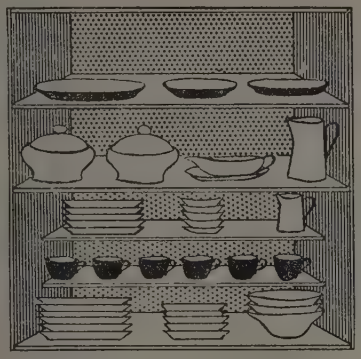
You will appreciate, too, the economy of travel by train; the convenience of having much of your luggage in the carriage with you; and the roominess and amenities of the modern train.

★

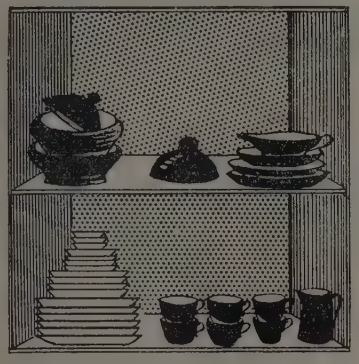
Consult your nearest Railway Booking Office, Agency or Government Tourist Bureau for further information.

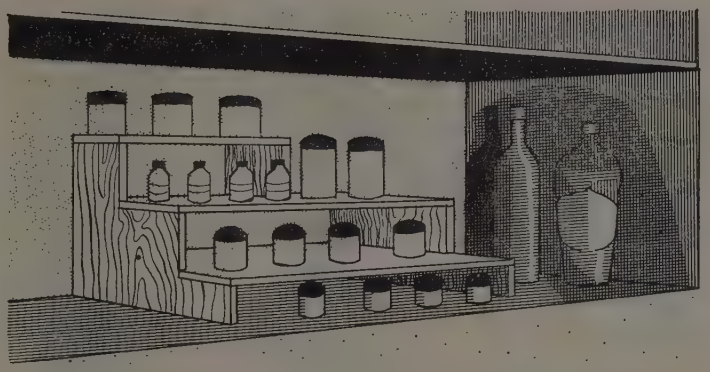
USE "RAILWAY" TRAVEL SERVICES!

NEW ZEALAND RAILWAYS

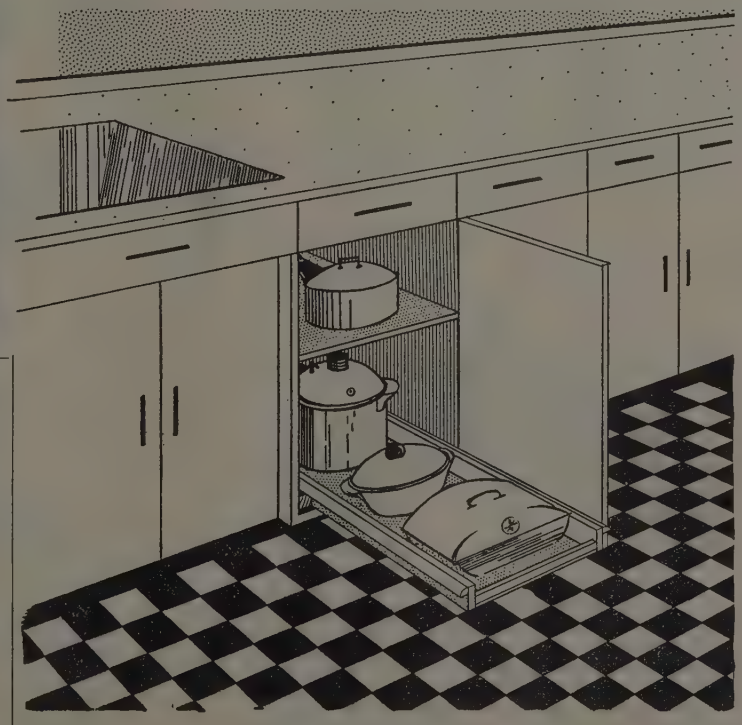


Store like things in separate piles. If shelves are widely spaced (below) insert extra shelves or half shelves (above).





Stepped shelves bring small tins, bottles, and jars clearly into view.



Sliding shelves for deep cupboards.

small shelves hung beneath full-sized ones. Meat platters or unusual shaped dishes can be stored in these to avoid unloading a stack before the right dish can be found. Shallow hanging shelves will provide convenient storage space for supplies such as cereals, condiments, and spices which are first required at the cooking centre.

Sliding Shelves

Sliding shelves are of value for bringing into reach heavier articles such as saucepans which are stored in deep, narrow cupboards.

The pull-out type of vertical panel is useful for hanging smaller cooking utensils on.

Vertical Partitions

One of the most effective ways of improving cupboard storage for articles which do not stack is by the use of vertical partitions. For ease of cleaning it is desirable that these partitions should be removable. They may consist of plywood held in position in grooves or they may be removable box-like partitions. Cake tins, patty tins, and roasting tins will require less space and be easier to find if they are stored in this way. Vertical partitions are equally useful for storing tea trays, oven trays, and odd shaped plates or serving dishes. A deep drawer can be divided in the same way.

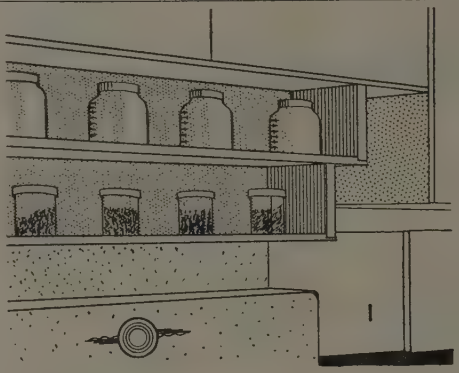
Racks on Doors

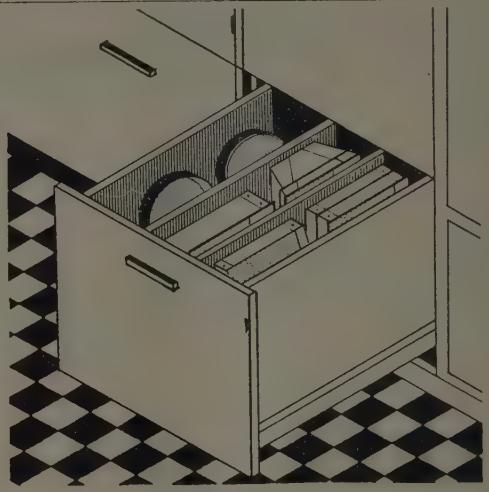
Small, light racks may be placed on cupboard doors to hold items such as essences and spices which are difficult to find in deep cupboards.

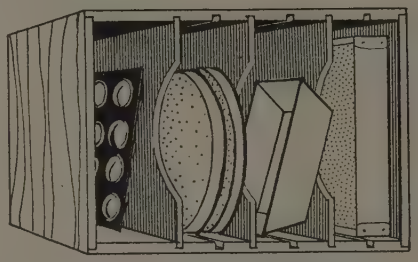
Provided the hinge of the door is sufficiently strong, a rack may be placed on the door of the under-sink cupboard to hold a light garbage can. This brings the can into easy reach when it is required.

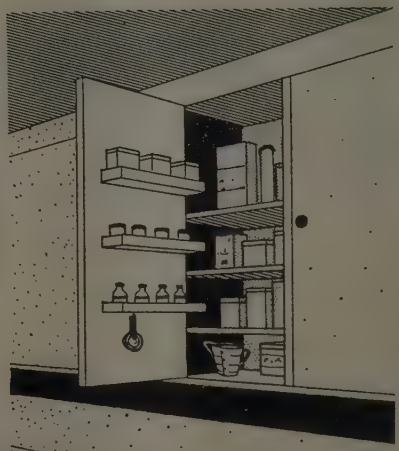
Revolving Cupboards

Where benches or cupboards meet at a right angle the corner space beneath

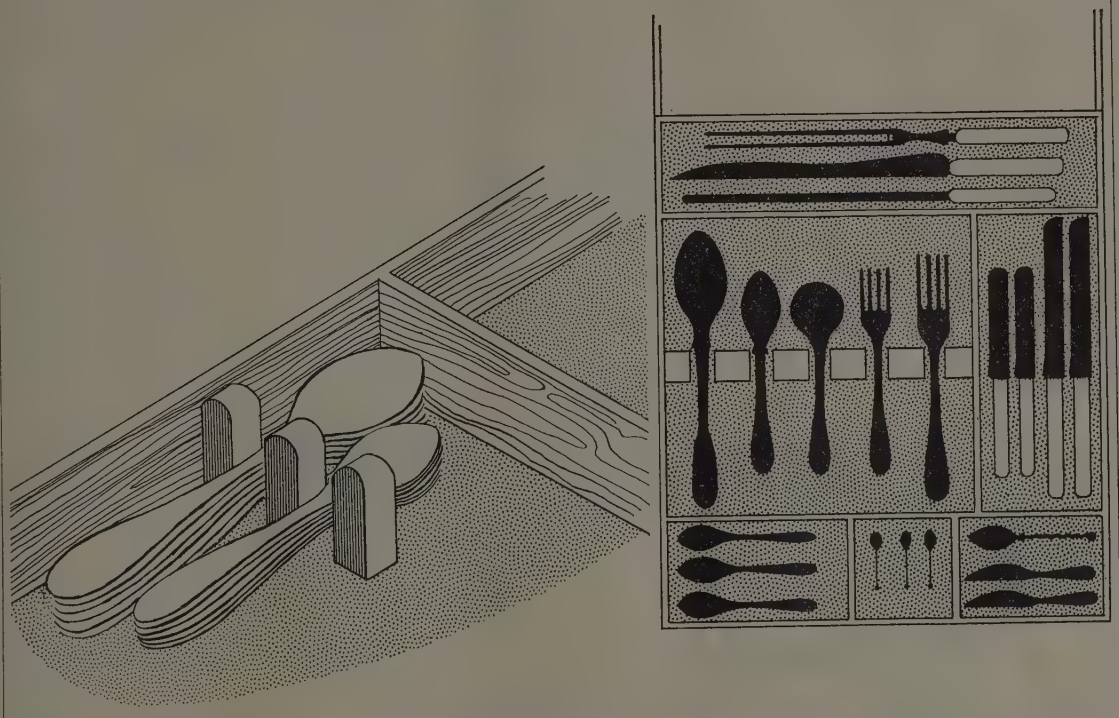




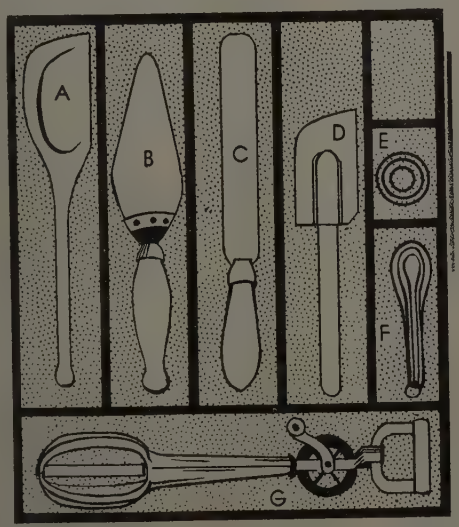




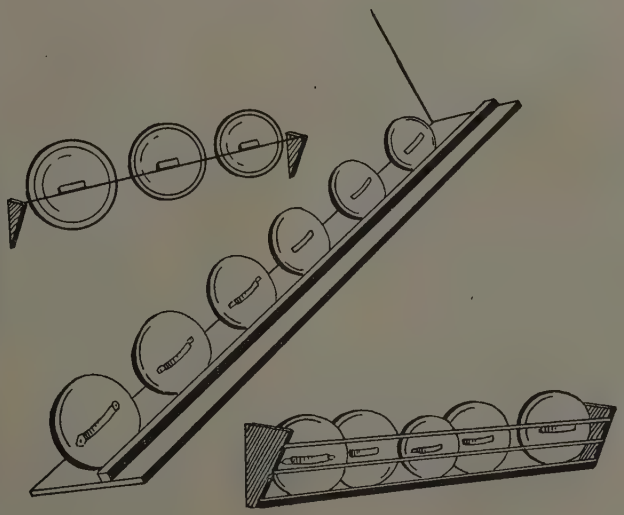
1—Hanging shelves reduce waste space. These shelves are over the range. 2, 3, 4—Vertical partitions for items which do not stack. 5—Revolving cupboards make good use of corner space. 6—Small, light racks can be fitted inside cupboard doors.



Silver and cutlery (above) and cooking utensils (below at left) are easily found in partitioned drawers.



A—Wooden spoon. B—Cake trowel. C—Spatula. D—Rubber kitchen aid. E—Set of biscuit cutters. F—Set of measuring spoons. G—Egg beater.



Simple fixtures for saucepan lids. Upper—Dowelling or thick wire is fastened $\frac{3}{4}$in. out from the wall or door. Pot lids can be slipped behind it, resting on their handles. Middle—This type of rack is suitable for the back of a fairly narrow shelf. Lower—This rack can be put on a wall or on the back of a door.

A hang-up rack for utensils used at the stove.

is often wasted, but ingenious use may be made of this by installing a revolving cupboard. Circular shelves with a wedge shaped section removed are attached to a central pole which rotates in a socket. The shelves will rotate in either direction, bringing into view any article stored on them. A narrow rim attached to each shelf eliminates the possibility of articles falling off as the cupboard rotates. Above-bench corner space can be utilised in the same way or by installing fixed triangular or semi-circular shelves.

Partitions for Drawers

Cooking utensils are generally an assortment of shapes and sizes and the utensil drawer will assume a much more orderly appearance if partitions are inserted. To indicate which partition is intended for a particular utensil a silhouette may be painted or drawn on the bottom of the drawer. Many of the smaller items can be hung conveniently in a rack or on hooks close to where they are most often used.

The silver and cutlery drawer should also be partitioned. There is less wear and tear on the silver and table setting is greatly simplified when silver is kept in separate compartments. If space is wasted because the drawer is deeper than necessary, a shallow sliding tray made half the length of the drawer will provide extra partitions and make the drawer more useful.

Saucepan lids often present a storage problem and frequently tumble out of badly arranged cupboards when the door is opened. The place where saucepan lids are first required is at the stove, so it is here that a rack should be placed. Some housewives may prefer to have the lids out of sight and a fixture can then be placed inside the saucepan cupboard door. An effective rack can be made very easily from expanding curtain wire or dowelling or by a small ledge attached to a narrow shelf.

A Check Suggested

If it is necessary to stand on a stool each time some frequently used article is required, to walk round a large table to get the flour, to rummage through a drawer or cupboard for the wooden spoon or essence bottle, or to take down all the plates to get the larger size, a cupboard check will be well worth while. One experiment has shown that by rearrangement of storage space the distance a housewife travelled in her kitchen could be reduced from 5 miles to 2¼ miles daily. With careful planning and the help of the handyman an inconvenient kitchen may be transformed into a pleasant place in which to work and more time for leisure should result.

New Life for Nylon Stockings

ODD, unladdered nylon stockings can continue to be useful. A collection of nylon stockings the mates of which have been discarded because of holes or ladders may yield three or four pairs of stockings with similar or identical fashioning at the heels, but their colours will most probably not match. This may be rectified by boiling the stockings for a few minutes (no longer than 5 minutes) in a solution of a good brand of soap powder (not flakes). The stockings should be completely covered, and they should be gently stirred to prevent the colour "streaking". The different colours merge in the boiling soap solution and the stockings should emerge with a uniform colour, slightly lighter than that of the medium colour in the originals. The stockings should not be boiled too long, as the dye will continue to leak out into the soap solution and the stockings will become very pale as well as being weakened by prolonged overheating.

—*BETTY M. JOHNSTON,*
Field Officer in Rural Sociology,
Department of Agriculture,
Wellington

Fuchsias for the Flower Garden

THE first fuchsia species to be introduced into cultivation came to England from tropical America toward the end of the 18th century and it was not long before many interesting and colourful hybrids were raised. These were soon to become one of the most popular garden subjects, for not many plants are as versatile as the fuchsia. The garden hybrids reached the peak of their popularity about the middle of last century and then gradually fell from favour, though a few raisers continued to introduce new varieties. In the 1920s the public again began to appreciate their qualities and in 1929 the American Fuchsia Society was formed. There followed, in 1938, the formation of the British Fuchsia Society, which in spite of the war continued to expand and to produce the "Fuchsia Annual". After the war, when some of the outstanding new varieties reached New Zealand from overseas, there was an increased interest shown here and the New Zealand Fuchsia Society was formed in Auckland a couple of years ago. The first section of this article, which is by J. S. Say, Horticulturist, Department of Agriculture, Auckland, discusses the growing of fuchsias in the flower garden. The section on garden work for July is by K. H. Marcussen, Horticulturist, Department of Agriculture, Christchurch.

THOUGH many gardens, especially in the warmer parts, have a plant or two, few gardeners realise the value of fuchsias as a decorative garden plant. Frequently gardeners base their ideas of fuchsias on the older, red and bluish purple varieties which have now been superseded by varieties with flowers of soft pastel pinks and mauves, white, and bright clear reds and purples. Apart from the many different colours and colour combinations of fuchsias now available there is a wide range of flower shapes and sizes, ranging from almost minute flowers to very large doubles. In growth habit there is everything between the extremes shown in the two native fuchsias *F. procumbens*, with its thin, trailing growth, to the tree-like form of *F. excorticata*.

Use as Bedding Plants

As bedding plants fuchsias are now almost completely ignored, yet there are many gardens where they could be used. They have a very long flowering season and as they can be classed as more or less permanent plants, they are ideal for the gardener who has not the time to plant with annuals several times a year. Though not as bright and showy as many of the popular bedding plants and herbaceous perennials, fuchsias have a quiet charm which fits in particularly well with the more informal type of garden. A bed in partial shade or on the shady side of the house, where perhaps it is difficult to get other plants to grow well, is very suitable. During winter they could be underplanted with low growing annuals, bulbs, or polyanthus.

The more vigorous growers, some of which assume almost tree-like proportions, can be used in a shrub border. Some of the artificially trained forms, such as standards, pyramids, and columns, are excellent when used as accent plants or to give height in a border of mixed flowers.

In many gardens there is often a narrow bed, sometimes only a foot wide, between a path and house or boundary fence. Low growing plants look out of place against the high walls and taller plants often encroach on the path. In such a position a fan or espalier fuchsia cannot be bettered, because it can be confined to a 6in. to 8in. width and will stand the shade which often makes such narrow and confined beds so difficult to plant.

Various Forms

Some of the vigorous types can easily be trained up 6ft. to 8ft. and sometimes to 15ft. and are particularly useful for pillars, trellises, and arches, as fuchsias to be seen to best effect should be viewed from below. Having tall fuchsias growing on top of a bank with prostrate forms trailing over it is another effective way in which the species can be used in a position which sometimes presents difficulties. Prostrate forms can be used for trailing over low retaining walls or the built-up beds which are an architectural feature of some modern houses.

For an informal ornamental hedge or division between two sections of the garden fuchsias can be used to very good effect. They cannot be trimmed to a compact shape like escallonia, for example, without cutting off their flowers, but for those who do not object to a little informality about their gardens the effect is both attractive and colourful. Other ways in which they can be used are for furnishing glass and lath houses, as pot and tub plants, and in hanging baskets and window boxes.

Apart from the fuchsias grown solely for their flowers there are a number with coloured and variegated leaves. Some have creamy white and pink variegations and others golden or bronze leaves.

Soils

The basic requirement for fuchsias is a well-drained soil that will remain cool and moist in summer. The soil should be well dug and plenty of organic matter should be added. This can be compost, leafmould, well-rotted animal manures, or peat. As fuchsias prefer a slightly acid soil, peat is particularly suitable if it can be obtained.

Marinka is one of the most popular of the older fuchsias. The sepals are a rich crimson and the corolla is scarlet crimson, making it an almost self-coloured flower. It makes a good standard and can be used for baskets.

[*Sparrow*

Above—Fuchsias with a naturally pendulous habit are ideal for hanging baskets. Below—The variety Gartenmeister Bonstedt, which has long, tubular, red flowers and bronze foliage.

[*Sparrow*

Fuchsia Varieties

Fuchsias, mostly the newer varieties, that are particularly suitable for training as standards, bushes, against trellises or walls, or in hanging baskets are:—

Variety	Description
Standards	
Phyllis	Rather small carmine pink flowers in profusion
Golondrina	Single; sepals, rose madder; corolla, magenta splashed red; continuous bloomer
Falling Stars	Single; sepals, salmon; corolla, turkey red
Major Heaphy	Similar to Falling Stars; strong grower
Festival	Sepals, white flushed pink; corolla, carmine red
Mrs. Marshall	Sepals, waxy white; corolla, carmine; old variety; vigorous
Bushes	
Blue Pendant	Double; sepals, rose; corolla, light blue to rose
Flying Cloud	Double; sepals, white; corolla, white flushed pale pink at base of petals
Serenade	Single; sepals, light coral; corolla, clear cerise; vigorous
Snowball	Large double; sepals, creamy white; corolla, cream
Whitemost	Semi-double; sepals, pale pink; corolla, white
Upright Bushes	
Aurora Superba	Single; the most orange fuchsia to date
Bridesmaid	Double; sepals, white with a light carmine blush; corolla, pale lilac
Crinoline (American)	Sepals, white; corolla, soft lolly pink; should not be confused with an old variety with the same name
Flirtation	Large double; sepals, rose madder; corolla, soft pink
Mazda	Single; sepals, carmine; corolla, orange carmine
Reverie	Double; soft pale pink
Baskets	
Anna	Very large double; sepals, red; corolla, magenta; extra long flower stems; vigorous; also suitable for trellis
Cavalier	Single; long tube; light magenta, salmon toward bases of petals
Du Barry	Double; sepals, lolly pink; corolla, soft magenta striped pink; also suitable for trellis
Henri Poincare	Sepals, red; corolla, long, bell shaped, rich violet purple
Hallowe'en	Single; sepals, white flushed pink; corolla, red
Pastel	Semi-double; small; pink
San Pablo	Large double; sepals, carmine pink; corolla, lilac mauve
Trellis and Walls	
America	Single; sepals, red below with white flushed red above; corolla, red
Aunt Juliana	Double; sepals, carmine; corolla, lavender blue; very large flowers; also suitable for baskets
Pan America	Large double; sepals, red; corolla, palest pink; also suitable for baskets
San Mateo	Sepals, pink; corolla, very large, violet splashed pink; also suitable for baskets
Utopia	Single; sepals, dark red; corolla, red; petals have a saw-tooth edging
Uncle Jules	Sepals, red; corolla, dark violet

Position

The species and garden varieties vary a great deal in the amount of sun they will stand. Some, such as Gartenmeister Bonstedt, which has long, red, tubular flowers and bronze leaves, stand the full sun in Auckland but generally fuchsias, especially the hybrids, like a moderate amount of shade. A position where they receive shade during the hottest part of the day, or better still where they get dappled sun and shade from fairly open trees, will suit them well. It will often be found that sunlight increases the number of flowers at the expense of quality and vice versa. Too much shade causes weak, soft growth.

As fuchsias make their growth and flower in the rainy season in their natural habitat, they must be well watered and sheltered from wind and the air about them must be kept as humid as possible. No amount of moisture at the roots will counteract the hard, pinched growth that often occurs in hot, drying winds. Shelter, too, is necessary to prevent damage, as fuchsias are very brittle and liable to break if exposed to strong winds.

[*Sparrow*

Fuchsias in tubs and wall boxes are a striking feature at the entrance to this home.

Planting

As fuchsias bought from the nursery are usually pot grown, planting can take place at almost any time except in late autumn and winter in frosty districts. Plants which appear very soft and succulent when received may have been grown in a shade house or glasshouse.

It is not advisable to plant these straight into the open; plants should be hardened off first by standing them, still in their pots, in a moderately open position. Care should be taken that the pots do not dry out. Before a plant is set out the roots should be gently teased out if the plant is at all pot bound. Dormant plants are best moved just as, or just before, growth begins. Watering and overhead spraying should not be neglected if planting is done during the dry months.

Training

Fuchsias can be trained to a wide variety of shapes. Probably there is no other garden plant which lends itself to such a range of artificial shapes which, though far removed from nature in many cases, never give an incongruous effect. The habits of the species and garden varieties vary greatly when left to grow naturally. Some form large shrubs, some become neat, compact bushes, and others are more or less prostrate and trailing. Before attempting to train a fuchsia it is as well to know its natural habit of growth so that a variety with a suitable form is chosen or, conversely, when a certain shape is needed, to choose a suitable plant. For example, for a tall standard a vigorous upright grower should be chosen and not one that naturally forms a small bush.

The following description of training applies to all fuchsias whether growing in the open or under glass, in beds, or in pots. It is assumed also that in each case the plant is of the best type, that is, young and grown from a soft-wood cutting. Cuttings should be taken as early in the season as possible so that training can be carried out while the plant is in vigorous growth. Later in the season plants tend to produce flower buds at the expense of vegetative growth, which makes training more difficult. All flower buds should be removed while the plant is being trained and applications of nitrogenous fertilisers will help to promote growth.

Bushes

All fuchsias which are not naturally prostrate can be formed into a shapely bush with a little training. The centre should be pinched out when the young plant is about 6in. high and the top four shoots allowed to develop, any lower ones being rubbed off. These shoots should be stopped again after four pairs of leaves and the process repeated until a compact bush of the required size is formed. It may be necessary to remove completely some of the inside shoots if the growth is becoming too dense. Stopping should cease 6 to 8 weeks before flowers are desired.

Standards

Strongly growing varieties with a naturally arching habit are best for standards, which can be grown by two methods. One is much more simple than the other, but does not form such a strong stem. It consists of confining all growth to the one main leader by removing all side shoots as they arise. The leaves on the main stem should not be removed, as they help to strengthen the trunk. The plant should be securely tied to a stake, but the ties should be loose enough to allow the stem to develop. When the required height is reached the tip should be pinched out and the top 4 to 6 shoots allowed to develop until they have formed about four pairs of leaves and then they should be pinched out again. This should be repeated until a good top has been formed. It takes several months and sometimes a full season to build up the framework of a good standard, but standards are well worth this trouble.

The second method of training, though more complicated, builds up a far stronger stem. It follows the general lines of the first method except that the side shoots are not removed but are pinched out after the second pair of leaves has been formed. Subsequent growths arising from the side shoots are pinched out after their first pair of leaves. These growths nourish the stem, which will be much thicker and stronger than if they were removed as they grew. When the required height is reached the top is pinched out and the training then follows that detailed in the first method. The shoots up the main stem are removed when the top framework

TO

NORTH AMERICA

Fly with your own New Zealand and Australian Air Lines!

Direct from Auckland, fast twice-weekly services by the world's most modern airliners link New Zealand, U.S.A. and Canada — offering you the finest service across the Pacific.

- Fly express to San Francisco and Vancouver—or at your leisure. Stop-overs available at Fiji or magnificent Honolulu (no extra air fare).
- Choose from de-luxe first-class services with restful sleeper-chairs by Super Constellation, including the exclusive "Connoisseur" Service—
- or fly Tourist with excellent seating and cabin service—at a saving of 20% air fare.
- Prompt connections across U.S.A. or Canada—then on to Europe by associated British airlines.

QANTAS and TEAL

Qantas Empire Airways Ltd., in association with TEAL and B.O.A.C.

Inquiries: Leading Travel Agents or TEAL—Auckland, Wellington, Christchurch

NANZ5

"RID-RAT"

The

MONEY BACK GUARANTEED

Rat Killer

Get rid of Rats with "Rid-Rat"—the latest, most efficient Rat exterminator on the market. 100 per cent. effective . . . rats cannot detect it or become immune to its amazing rat killing power. Approved by Health and Sanitary Authorities, and the S.P.C.A.

READY TO USE — NON-POISONOUS TO CHILDREN, DOGS, CATS, POULTRY

From: GROCERS — CHEMISTS — SEEDSMEN — HARDWARE STORES, PRODUCE MERCHANTS, STOCK & STATION AGENTS THROUGHOUT N.Z.

Marketed by SCIENTIFIC PEST CONTROL LTD., P.O. Box 92, Auckland.
Agents for SOREX (London) LTD., England.

is formed. The height of the standard may vary from 2ft. to 6ft. according to the purposes for which it is to be used and the vigour of the plant.

Columns

Columns are sometimes known as cordons. The training follows very closely that described in the second method for standards except that the side shoots are stopped after the third pair of leaves. After the required height is reached the top should be pinched out and the side shoots allowed to develop and flower, but care should be taken that all growths are allowed to develop only as far as they conform with the general symmetry of the column.

Espaliers

Espaliers are best trained against a trellis with horizontal and vertical laths. The young plant should be set in position and allowed to grow naturally until about 1ft. to 18in. high with a well-developed leader and at least two good side growths. These two side growths should be brought down to a horizontal position gradually over several days, because if they are brought down in one operation, they may crack or break. To train these shoots in an outward direction and keep them well clothed is not easy, but requires care and patience. It is difficult to give definite instructions, but the general principle is as follows:—

The tip of the side shoot is pinched out when about 12in. of horizontal growth is made. One of the shoots arising from this point is trained out horizontally, but the second and all others arising along the stem are pinched out after two pairs of leaves have grown. The main horizontal growth is pinched out again when a further 9in. to 12in. has grown and the process is repeated. To get the next pair of horizontal branches above the first the main upright leader is pinched out at about 9in. above the first pair of branches. One of the top pair of shoots arising from this point is taken upward, the other is removed, and the pair of shoots just below is taken out horizontally. The procedure given for the lower branches is then followed. A good espalier has about five sets of horizontal branches.

Fans

Fans are easily trained against a trellis. The leaders are pinched out every 9in. or so and one or sometimes two of the shoots arising at these stops are grown on as secondary leaders. Other side shoots are stopped at every two or three pairs of leaves.

Climbers

There are no climbing fuchsias, but some vigorous types are often trained up the rafters of glasshouses or trellises and archways in gardens. Training follows the general lines of that given for columns or fans.

[*Sparrow*

Vigorous fuchsias are very suitable for training against high brick foundations on the shady side of a house. The variety Rose of Castile shown here is about 10ft. high.

Pyramids

To train a fuchsia into a perfectly symmetrical pyramid requires skill and a considerable amount of patience, but no other form shows the flowers to such great advantage. It may take two growing seasons to build the framework. A young plant should be allowed to grow to about 9in. high before it is stopped. One of the shoots which will arise at this point is taken up as the new leader and tied to a stake and when each side shoot (four shoots are sufficient) has developed three pairs of leaves the tips should be pinched out. When the leaf buds on these begin to grow the new leader should be stopped again. The procedure of stopping, selecting a new leader, and stopping again should be continued until the required height is reached and during this time all the side shoots should be pinched out after they have formed three pairs of leaves. In this way it is possible to build up a plant that is a perfect pyramid. It should be well furnished with branches, but should growths become too dense, some can be removed.

The plant should not be allowed to flower until the framework has been built up. If the plant is growing in a pot in a glasshouse or shade house, it should be turned frequently so that all sides receive equal light and it grows evenly.

Baskets

A plant with a naturally prostrate habit is best for a basket, though any that does not have an exceedingly erect habit may be used, but is not as easy to train. A basket with a diameter about 14in. is suitable.

In preparation for planting the basket should be lined about 1in. deep with damp sphagnum moss. It should be packed very firmly so that the soil will not fall or be washed through. The basket is then filled with a good potting compost and the plant set in the centre. Stopping is done after the third pair of leaves has formed and the shoots as they grow are trained out evenly in a horizontal position. Stopping continues after each third or fourth pair of leaves until the basket is well furnished, when the plant can be allowed to flower.

Maintenance

Fuchsias are easy to grow and frequently have to suffer a considerable amount of neglect on this account. Though they will often do remarkably well with the minimum of attention, a little more care is worth while. They like plenty of water during the hot months and even when the soil is moist plants benefit from a spray over the leaves from hose or watering can, especially on hot, drying days. Overhead spraying also helps to keep red spider and thrips in check. Water is especially important with potted fuchsias, as they flag very readily under dry conditions. On the other hand, over-watering and poorly drained soil can be fatal to pot-grown plants. Plants in the open should be given a good mulch in spring to keep

the roots cool and to conserve moisture.

Though they are not gross feeders, fuchsias respond to a dressing of fertilisers two or three times during the growing season. Blood and bone, fish manure, or a mixture of 3 parts of superphosphate, 1 part of sulphate of ammonia, and 1 part of sulphate of potash are suitable, but manuring will not compensate for poor growing conditions.

Over-wintering presents a problem in the colder parts of New Zealand. Though fuchsias are often regarded as very tender plants, some will stand considerably more frost than is generally thought. Quite frequently the tops will be killed, but shoots will arise from the roots in spring. In very cold parts the plants can be lifted in late autumn and heeled in in a sheltered position for winter and planted out again in spring. Where frosts are not so severe fuchsias growing in a sheltered position will be fairly safe from serious damage, but if a little extra protection can be given, so much the better.

In very cold districts the problem of over-wintering can be overcome by growing fuchsias in pots or tubs, which can be placed or plunged in a suitable position in the garden for the warm months and then brought into shelter for winter. Plants that are used in this way will often root over the top of the pot or through the hole in the bottom, but it will not harm the plant if these roots are cut or broken when the plant is lifted for winter. Extra care with watering and feeding will be needed for such plants during summer and repotting will be necessary each spring.

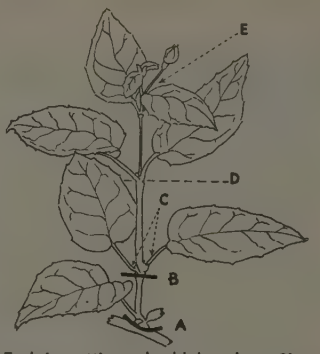
Pruning

Pruning is not difficult even with the artificially trained forms. All dead, weak, and superfluous growth should be removed first and the remaining healthy wood of the previous season's growth cut back fairly severely, especially toward the centres of the bushes. Light pruning over a period of years encourages an undesirable mass of interlacing twiggy growth.

Artificially trained forms, such as pyramids and espaliers, should not be cut back into the old wood of the original framework and care should be taken not to spoil their shape. Pruning is done in late winter or early spring just before growth normally starts and has to be followed by some stopping (described under "Training") to keep the bush in shape and to promote a plentiful supply of young flowering shoots. Stopping should cease 6 to 8 weeks before flowers are wanted.

Propagation

Fuchsias are among the easiest of plants to strike from tip cuttings.



Fuchsia cuttings should be about 2in. to 3in. long. The cut can be made just below a pair of leaves (B) or with a heel of older wood (A). The lower leaves (C) and flower buds (E) should be removed and the cutting inserted up to D.

Strongly growing young shoots about 3in. long, preferably without flower buds, should be used. They should be cut cleanly with a sharp knife immediately below a node and the lower pair of leaves trimmed off. Suitable rooting media are pure coarse river sand or a mixture of half sand and half soil (or peat) in a flower pot. The cuttings should be watered when put in and under suitable conditions should not need water again for some days. Gardeners with a glasshouse or frame should have no difficulty in getting them to root and those without these facilities will have little trouble if the pot of cuttings is stood in a box and covered with a sheet of glass, which should be turned each day to get rid of the condensed moisture. Tip cuttings can be taken at almost any time when suitable cutting material is available, but the best time is in spring or early summer. Hardwood cuttings taken during the dormant season are sometimes used, but though they root fairly readily, they do not form such a satisfactory plant as those grown from tip cuttings.

Most fuchsias can be raised very easily from seed, but as the garden varieties are hybrids of very mixed parentage, seedlings show considerable variation in colour, form, and shape of flowers and in growth habit. Raising of plants in this way should be restricted to growing from seeds produced from a deliberate cross with some definite breeding programme in view. Seedlings raised from berries gathered indiscriminately are rarely worth garden room. Because of the structure of the flower, cross-pollination presents no difficulties to anyone interested in plant breeding.

The easiest way to clean the seed is to squash the berries on a piece of blotting paper and allow them to dry in a warm place for a day or two, when the seed can be picked out easily. If a glasshouse is available, seed can be sown as soon as it is ripe in late autumn or winter, but otherwise it is best to leave it until spring. A mixture of 2 parts of loam, 1 part of leafmould or peat, and 1 part of sand is suitable for sowing seed in. As soon as the seedlings are big enough to handle they should be pricked out into a similar mixture and later potted up or planted out in the open as required. The majority of seedlings will flower within the first season and any that are obviously not up to standard should be discarded (unless they are wanted for breeding); the others should be grown on for a further trial. It is a good plan to allow seedlings to grow with the minimum of training for the first season so that their natural growth habit can be seen.

Pests and Diseases

Fuchsias are remarkably free from serious pests and diseases. Verticillium wilt occasionally causes the death of plants, but otherwise they can be said to be disease free. Red spider, thrips, and white fly are the most troublesome of the pests, especially during hot, dry weather and in glasshouses. Frequent overhead spraying with water usually keeps the first two under control, but if spraying has to be resorted to, summer oil is suitable for red spider and D.D.T. emulsion for thrips and white fly. Grass-grubs sometimes cause trouble by eating the roots, but can be controlled by working D.D.T. powder into the soil about the plants. Other pests which may do damage are aphides, caterpillars, and mealy bugs. Generally they are of little consequence and can be controlled by nicotine sulphate, D.D.T., and summer oil respectively.

References

"A Fuchsia Survey", W. P. Wood.

"A to Z on Fuchsias", California Fuchsia Society.

"How to Grow Fuchsias", Frances Howard.

"The Fuchsia Annual", British Fuchsia Society.

"The Fuchsia Book", Alfred Sheffler (American Fuchsia Society).

Flower Garden in July

At this time of the year there is little growth in the flower garden, but the keen gardener will always find jobs that can benefit established plants and by thorough preparation now get more out of plants that will be flowering in the coming season.

Any beds containing actively growing plants should have the surface kept loose, either by hoeing or forking up. This will assist the plants by allowing more air to penetrate to the roots and will also reduce run-off of rain-water.

The latter may not seem important now, but a good soaking of the subsoil during winter will prove beneficial during a dry summer.

Trees and shrubs can still be planted out and, except for evergreen and frost-tender plants, planting should be completed during this month. Evergreens are best planted in late autumn, but subjects such as camellias and rhododendrons should preferably be planted out in early spring, when they will be growing actively and are able to establish more quickly.

Any area to be sown down in lawn during spring should now be made ready. After digging, the soil should be consolidated by heeling in if conditions are suitable. This should not be done on a heavy soil if it is at all wet; natural settling of such a soil is preferable. During dry spells a gradual levelling off should be carried out, so that by the time sowing is to be made the area is level with only the top ½in. to 1in. remaining loose. Sowing should not be done before August or September, according to locality.

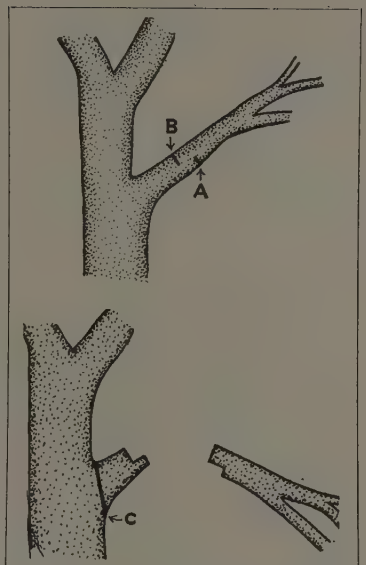
Where a herbaceous border is to be planted out in spring the ground should be made ready now. It should be dug to a depth of at least 18in. and animal manure or half-rotted compost incorporated. A dressing of basic slag at 6oz. to the square yard or superphosphate at 4oz. should also be applied; the former is preferable on heavy soils. A definite recommendation on liming cannot be given, as the requirements of soils vary, but a dressing of 2oz. to the square yard is often beneficial after applications of organic material, as most herbaceous plants prefer a neutral soil. Positions should then be marked and labelled for the different plants, so that they can be planted directly in their permanent quarters if weather conditions are at all suitable when they arrive.

In the most favourable localities hardy bedding plants for early summer display can now be sown in open ground; they can include antirrhinum, calendula, *Phlox drummondi*, and stock.

Pruning Trees and Shrubs

It is very important to train trees and shrubs during the early part of their life, when the permanent structure is being developed. Trees may, for example, develop two leaders; if only one is required, the weaker should be removed carefully. Likewise the leading shoot and major side branches can be pruned judiciously to the required shape. Neglect in pruning during early years may result in need for severe topping later. This weakens the tree and often spoils its natural beauty.

If a large branch must be removed, it should be done in the proper manner, as shown in the illustration above. The resulting clean cut will facilitate better healing of the wound. The first cut is made 12in. to 18in. from the trunk and to about a third



Stages in the removal of a large branch. A—First cut. B—Second cut. C—Third cut.

of the way through the branch. This is to ensure that the bark and outer wood will not be pulled off below the cut when the branch falls. The second cut should be made a few inches closer to the trunk. Care should be taken to ensure that nothing will be damaged when the branch falls. If any danger exists, a tree-felling expert should be consulted, as the branch may have to be lowered with supporting ropes and possibly in sections. The stump of the branch should finally be cut off cleanly as shown in the illustration.

Many flowering trees and shrubs should be pruned now. The aim of pruning is to remove dead and diseased wood and regulate growth for shape and better flowering. To get the best flowering it may be advisable to thin out some of the growth, thereby ensuring flowers of better quality, even if they are less numerous.

Most spring flowering trees and shrubs are best pruned immediately after flowering, as they generally carry the blooms on shoots produced the previous season. Pruning subjects such as forsythia, winter flowering jasmine, and ornamental prunus during winter will remove much wood which could have flowered within a few months. Better results will be obtained if such pruning is delayed until the flowering season, thereby supplying cut flowers for the house.

All major pruning cuts should be covered with bituminous paint to prevent entry of disease organisms.

Roses

Rose pruning will be done in many districts during this month. Little is gained by pruning too early and in the coldest districts it should not be done until late August or September.

Best flowers are produced from young and vigorously growing wood. The aim in pruning roses should therefore be to remove branches which are more than one year old and to replace them with matured growth from the last season. The extent to which these remaining branches should be pruned back will depend on the variety and also on the climate; longer pruning can be practised in northern districts than would be advisable in the south.

Newly planted roses should be pruned fairly hard to compensate for the loss of roots during transplanting; climbers, however, should not be pruned hard, as that may result in loss of the climbing habit. Climbers should be tied in as they are being pruned. When canes are placed as near to horizontal as possible development of a greater number of flowers will be encouraged.

Ties should be removed from standard roses to ensure that no scale insects are harbouring underneath. If any are found, the area should be cleaned and brushed with winter oil. Old nylon stockings make excellent tying material for standard roses. If twine is used, some padding material should be placed underneath it to prevent damage to the stem.

Where rose beds have not been enriched by a mulch during summer a dressing of animal manure or compost should be applied immediately after pruning and dug into the top 3in. If this is done while the buds are even little damage will result, but if the work is left until growth develops, some of the young shoots may inadvertently be broken off by the gardener as he moves between bushes.

Winter Oil Spray

Application of a winter oil spray to roses and deciduous trees and shrubs will prove very beneficial. It will destroy scale insects and a large proportion of various insect eggs; it is also considered to improve the general condition of the bark and may assist the healing over of small pruning cuts. For making 4 gallons of spray 1 3/5 pints of oil is required.

"A Long-sleeved Knitted Blouse"

IN the article "A Long-sleeved Knitted Blouse of Charming Design", which appeared on page 442 of the April issue of the "Journal", the description of the materials, measurements, and tension was omitted.

This was as follows:—

Materials: 6oz. of 2-ply wool, 2 No. 10 and 2 No. 12 knitting needles, 5 buttons.

Measurements: Length 18½in., bust 34in., sleeve seam 18in.

Tension: 8 st. to 1in. over pattern.

January 1-112, February 113-224, March 225-336, April 337-448, May 449-544, June 545-656.

A
Adams, T. W., and McIntosh, I. G.—Control of Rats and Mice, 229.
Aerial Topdressed Tussock Land in South Canterbury, Survey of, 305.
Agriculture, Correspondence Courses in, 90.
Agriculture in New Zealand's Island Territories, 3.
Ammonia, Sulphate of, Acidifying Effect of, 416.
Animal Health and Molybdate Topdressing, 196.
Animal Production Society's Conference, 367.
Antibiotic Supplements with Separated Milk in Pig Feeding, 85.
Apples, Granny Smith, Ring Spot on, 283.
Apron, Housework, Pockets in, 336.
Arsenic Trioxide, Poisoning Wild Pigs with, 511.
Arthur, H. A.—Modified Rotary Hoe on South Canterbury Farm, 371.
Auckland District, Value of Cropping in, 609.
Auckland Home Gardens and Orchards, Shelter for, 579.
Autumn-sown Pastures, 25.

B
Ball, E., and Hockey, K. C.—Glasshouse Tomato Spacing Trials, 608.
Banfield, G. L.—Preparing Seed-bed for Autumn-sown Pastures, 25.
Barberry, Seedless, Propagation of, 477.
Barley, Malting, Header Damage in, 13.
Barrer, P. R.—Wheat and Oats, 265.
Bates, E. M.—Winter Rotation of Dry Stock on the Dairy Farm, 227.
Bay of Islands Farm, Increasing Production on, 615.
Bee Colonies, Domestic, Autumn Management of, 267.
Beehives, Folding Wheelbarrow for Moving, 307.
Beekeeper's Cool Room, 355.
Beekeeping, Domestic, Notes, 89, 147, 267, 411.
Beeswax Mould, Simple, 505.
Beeswax, Steam Press for Salvaging, 83.
Bell, J. E.—
Autumn and Winter Pasture Management, 125.
Common Salt and Muriate of Potash, 81.
Northland Gumland Development, 589.
Soil Testing Service to Farmers, 507.
Value of Cropping in Auckland District, 609.
Bins, Kitchen, Easy-to-operate, 327.
Blake, G. A.—Management of a Matamata Dairy Farm, 363.
Blouse, Long-sleeved Knitted, 442, 653.
Bobby, F. C.—
Commercial Egg Production in Britain, 401.
Poultry Flock Improvement Plan, 271.
Poultry Husbandry in Britain, 151.
Sixth Laying Trial of Prospective Poultry Breeding Stock, 471.
Boilers, Double, for Cookery, 208.
Book Reviews, 112, 240.
Booth, A. K.—Topdressing in Waimarino County, 497.
Break Feeding of Turnip Crops, 493.
Breeding Stock, Prospective Poultry, Sixth Laying Trial of, 471.
Britain, Commercial Egg Production in, 401.
Britain, Poultry Husbandry in, 151.
Brown, I. L.—Commercial Raspberry Production in Nelson District, 417.
Buchan, R. G.—An Efficient Sheep Dip Stirrer, 80.
Bull, H. McM.—
Device to Stop Lambs from Drowning in Drinking Troughs, 488.
Pasture Management on Hill Country, 125.
Burgess, A. C.—Autumn-saved Pasture, 265.

C
Canning, Home, 437.
Canterbury, Lime in, 25.
Canterbury, South, Farm, Modified Rotary Hoe on, 371.
Canterbury, South, Survey of Aerial Topdressed Tussock Land in, 305.
Canterbury, Wheat Growing in, 161.
Cardigan, Girl's Knitted, 637.
Carpet Beetle Damage, 629.
Central Otago, Cherry Growing in, 49.
Central Otago, History of Fruit Growing in, 169.
Ceylon, Maha Iluppallama, Agricultural Research Station in, 546.
Chatham Islands, Farming on, 338.
Chemical Weed Control, 187, 400.
Cherry Growing in Central Otago, 49.
Cherry, Mount Fuji Flowering, 270.
Chewings Fescue Seed, 589.
Chinese Wisteria, 458.
Circular Saw, Farm, Danger of Faulty Use of, 282.
Clarke, N. A.—
Increasing Production on a Bay of Islands Farm, 615.
Oversowing Dairy Pastures, 265.
Topdressing, 125.
Clematis indivisa, 476.
Cloths, Table, Napkins, and Mats, Making, 535.
Clovers, Tolerance of, to Weedkillers, 450.
Clover, Subterranean, Pastures, Light Land, 31.
Clover, White, in Poverty Bay, Lamb Fattening off, 295.
Clutha Basin, Lower, Land Development in, 311.
Coastal Gardens, Trees and Shrubs for, 517.
Coastal Sand in Wellington Province, Pampas Grass on, 599.
Colombo Plan Aid, N.Z.'s Practical, 546.
Compost Heaps, Making, 137.
Concrete Posts for Farm Fences, 362.
Concrete Posts, Reinforcing of, 240.
Congdon, N. B.—Home Orchard in Winter, 465.
Cook, A. B.—Danger in Storing Seeds near Weedkillers, 502.
Cool Room, Beekeeper's, 355.
Correspondence Courses in Agriculture and Horticulture, 90.
Coulter, Adapted, Drilling Pastures with, 310.
Couston, Eleanor—
Better Kitchen Cupboards, 639.
Diets for an Invalid, 105.
Cover Crops in Home Orchard, 157.
Crop Experiments, Field, in New Zealand, History of, 256.
Cropping in Auckland District, Value of, 609.
Crop Production, 265.
Crops, Cover, in Home Orchard, 157.
Crops Damaged by Opossums, 238.
Crops, Forage, Cultivation for, 375.
Crops, Market Garden, Trace Element Deficiencies in, 563.
Crosbie, C. J., and Jolly, R. G.—Header Damage in Malting Barley, 13.
Cultivation, Deep, in Home Garden, 481.
Cultivation for Forage Crops, 375.
Cultivators and Hoes for Home Garden, 70.
Cunningham, I. J.—
Lamb Growth on Pasture Topdressed with a Complex Trace Element Mixture, 239.
Molybdate Topdressing and Animal Health, 196.
Cupboards, Kitchen, Better, 639.

D
Dairy Farm, Matamata, Management of, 363.
Dairy Farms, Subdivision on, with the Hunter Fence, 312.
Dairy Farm, Winter Rotation of Dry Stock on the, 227.
Dairy Pastures, Oversowing, 265.
Dairy Pastures, Weed Control in, 562.
Dairy Produce Graded for Export during November, 12; during December, 124; during January, 264; during February, 374; during March, 492; during April, 588.
Dates, Handy Packets of, 112.
Deep Cultivation in Home Garden, 481.
Denize, C. D.—Electric Fence in Winter Feeding of Sheep, 272.
Desserts, Fruit, for Winter, 542.
Desserts, Fruit, Quickly Made, 425.
Diet, Potatoes in, 329.
Diets for an Invalid, 105.
Dingwall, A. R.—
Cropping Programmes, 265.
Swamp-land Improvement with Hydraulically Controlled Plough, 273.
Diploma in Fruit Culture, 285.
Dipping of In-lamb Ewes, 464.
Dip, Sheep, Stirrer, 80.
Diseases, Poultry, Prevention of, 27.
Dolman-sleeved Knitted Pullover, 448.
Domestic Beekeeping Notes, 89, 147, 267, 411.
Double Boilers for Cookery, 208.
Drainage, Mole, 395.
Drain Cleaning Attachment for a Tractor, 491.
Dredge Tailings in Westland County, Regrassing of, 384.
Drenching to Control Worms in Sheep, 23.
Drilling Pastures with an Adapted Coulter, 310.
Dryland Farming Methods, 383.
Dry Stock on the Dairy Farm, Winter Rotation of, 227.
Duff, H. A.—Farm Storage of Potato Crop, 407.
Duncan, A. A.—
Chemical Weed Control, 400.
Oversowing and Topdressing on Wanganui Hill Country, 287
During, C.—
Double Superphosphate, 81.
Pasture Responses to Minor Elements, 513.
Problems in Interpreting Soil Analyses, 279.

E
Earl, J. H., Death of, 238.
Eczema, Facial, Prevention of, 300.
Edwards, E. D.—Harper Adams Pig Fattening House, 141.
Egg Production, Commercial, in Britain, 401.
Egg Production, Winter, of Household Poultry, Improving, 495.
Eilers, Daphne—Yeast Cookery, 529.
Electric Fence in Winter Feeding of Sheep, 272.
Elements, Minor, Pasture Responses to, 513.
Elevator for Cleaning Poultry Houses, 591.
Elliott, A. G.—South Island Land Development, 589.
Elliott, I. L.—Onion Growing Trials on Rukuhia Peat, 489.
Ewe, Restraint of, in Paddock, 578.
Ewes, In-lamb, Dipping of, 464.
Exports of Pig Meats, Prospects for, 35.

F
Fabrics, Synthetic, Ironing, 328.
Fabrics, Testing Shrinkage in, 94.
Facial Eczema, Prevention of, 300.
Faithful, W.—Winter Pasture Management on South Island Fat Lamb Farms, 493.
Farm Circular Saw, Danger of Faulty Use of, 282.
Farmers' Week in Taranaki, 470.
Fat Lamb Farms, North Island, Winter Pasture Management on, 493.
Fat Lamb Farms, Pasture Management on, 125.
Fat Lamb Farms, South Island, Winter Pasture Management on, 493.
Fattening House for Pigs, Efficient, 459.
Feeding of Household Laying Birds, 241.
Feeding, Winter, of Sheep, Electric Fence in, 272.
Fence, Electric, in Winter Feeding of Sheep, 272.
Fence, Hunter, Subdivision on Dairy Farms with, 312.
Fences, Farm, Concrete Posts for, 362.
Fertilisers, 81.
Fertiliser Sales, Confusion of Terms Used in, 252.
Fescue, Chewings, Seed, 589.
Field Crop Experiments in New Zealand, History of, 256.
Film Review: "Carpet of Grass", 45, 470.
Fitzgerald, J. N.—
Control of Grass in Lucerne, 301.
Weed Control, 187.
Fitzgerald, J. N., Gordon, R. B., and Leonard, W. F.—Chemical Weed Control, 187.
Fitzgerald, J. N., Matthews, L. J., and Maclean, Shona M.—Tolerance of Clovers to Weedkillers, 450.
Flower Garden Notes, 95, 215, 313, 430, 517, 647.
Forage Crops, Cultivation for, 375.
Forster, I. W.—Steam Press for Salvaging Beeswax, 83.
Fowlhouse, Household, 11.
Freer, W.—Maha Iluppallama Agricultural Research Station in Ceylon, 546.
Fruit and Vegetable Scoop, 328.
Fruit Culture, National Diploma in, 285.
Fruit Desserts for Winter, 542.
Fruit Desserts, Quickly Made, 425.
Fruit Growing in Central Otago, History of, 169.
Fruits, Sugared, 212.
Fuchsias, Growing of, 647.

G
Garden Gate, Self-closing, 288.
Gardens and Orchards, Auckland Home, Shelter for, 579.
Gardens, Coastal, Trees and Shrubs for, 517.
Gate, Dual-purpose, for Woolsheds, 202.
Gate, Self-closing Garden, 288.
Gerlach, J. C.—Developing Agriculture in New Zealand's Island Territories, 3.
Girl's Knitted Cardigan, 637.
Glasshouse Tomato Spacing Trials, 608.
Gordon, R. B., Fitzgerald, J. N., and Leonard, W. F.—Chemical Weed Control, 187.
Graham, J. A.—
Winter Pasture Management on North Island Fat Lamb Farms, 493.
Young Pastures, 265.
Granny Smith Apples, Ring Spot on, 283.
Grapes, Research Work on Maturation of, 159.
Grasses, Pasture, Tolerance of, to T.C.A., 593.
Grass in Lucerne, Control of, 301.
Grassland Conference in Nelson, 39.
Grazing in Manlatoto County, Lucerne for, 605.
Greaves, N.—Autumn-sown Pastures, 25.

Greenfeed Crop, Ryecorn as a, 146.
Griffin, L. A. M.—Simple Wax Mould, 505.
Grinder Stand, Movable, for Woolshed, 509.
Guavas, 104.
Gumland, Northland, Development, 589.

H Hadfield, W. V.—Wheat Growing in Canterbury, 161.
Hamblyn, C. J.—
Mob Stocking on Hill Country, 242.
Winter Management of Pastures, 375.
Hansen, W. J.—Dual-purpose Gate for Woolsheds, 202.
Harding, Lesley—
Choice and Care of Nylon Stockings, 209.
Home Canning, 437.
Harper Adams Pig Fattening House, 141.
Hat Shape, Small, Trimming a, 224.
Header Damage in Malting Barley, 13.
Heath, Spanish, Control of, 48.
Helson, G. A. H.—Plant Quarantine in New Zealand since 1884, 115.
Herbs in Cookery, 214.
Hiam, N. J.—Self-closing Garden Gate, 288.
Hill Country, Mob Stocking on, 242.
Hill Country, Pasture Management on, 125.
Hill Country, Wairarapa, Breaking in, 415.
Hill Country, Wanganui, Oversowing and Topdressing on, 287.
History of Field Crop Experiments in New Zealand, 256.
History of Fruit Growing in Central Otago, 169.
Hive Equipment, Domestic, Maintenance of, 411.
Hockey, K. C., and Ball, E.—Glasshouse Tomato Spacing Trials, 608.
Hoe, Rotary, Modified, on South Canterbury Farm, 371.
Hoes and Cultivators for Home Garden, 70.
Home Canning, 437.
Home Garden Notes, 65, 131, 243, 385, 481, 617.
Home Gardens and Orchards, Auckland, Shelter for, 579.
Home Orchard in Autumn, 157.
Home Orchard in Winter, 465.
Honey, Extracted, Treatment of, in Small Apiaries, 147.
Honey House Construction and Layout of Plant, 126.
Honey, Vacuum Plant for Removing Excess Water from, 571.
Hopkins, J. M.—
Drilling Pastures with an Adapted Coulter, 310.
Subdivision on Dairy Farms with Hunter Fence, 312.
Hormone Control of Nodding Thistle, 515.
Horticulture, Correspondence Courses in, 90.
Household Poultry Notes, 11, 129, 241, 361, 495, 569.
Howse, A. C.—Prevention of Poultry Diseases by Good Hygiene, 27.
Hunter Fence, Subdivision on Dairy Farms with, 312.
Hyacinth, Water, in Rotorua District, Control of, 188.
Hydraulically Controlled Plough, Swamp-land Improvement with, 273.

I *Idesia polycarpa*, 436.
Invalid, Diets for an, 105.
Ironing Synthetic Fabrics, 328.
Irrigation Races, Cleaning, 394.
Island Territories, New Zealand's, Agriculture in, 3.

J Jacques, W. A.—Possibilities of Pampas Grass on Coastal Sand in Wellington Province, 599.
Jersey, Knitted, with Long or Short Sleeves, 335.
Johnson, L. H., and Moore, Evelyn E.—Easy-to-operate Kitchen Bins, 327.
Johnson, L. H.—Honey House Construction and Layout of Plant, 126.
Johnston, Betty M.—
A Scoop for Fruit and Vegetables, 328.
Choosing a Trousseau, 321.
Making Table Mats, Cloths, and Napkins, 535.
New Life for Nylon Stockings, 646.
Short Cut in Silver Cleaning, 100.
Sugared Fruits, 212.
Toddler's Sun Suit, 101.
Trimming a Small Hat Shape, 224.
Jolliffe, W. H.—Trees on the Farm, 237, 409, 503, 595.
Jolly, R. G., and Crosbie, C. J.—Header Damage in Malting Barley, 13.
Jolly, R. G.—
Light Land Subterranean Clover Pastures, 31.
Pastures for Seed, 375.
Jones, J. H.—Elevator for Cleaning Poultry Houses, 591.
Jumper Knitted, with Scarf to Match, 103.

K Kasza, D. S.—Research Work on Maturation of Grapes, 159.
Kemp, W. S.—
Cherry Growing in Central Otago, 49.
History of Fruit Growing in Central Otago, 169.
Kennelly, A. G.—Home Garden Notes, 65, 131, 243, 385, 481, 617.
Kitchen Bins, Easy-to-operate, 327.
Kitchen Cupboards, Better, 639.
Knitted Blouse, Long-sleeved, 442, 653.
Knitted Cardigan, Girl's, 637.
Knitted Dolman-sleeved Pullover, 448.
Knitted Jersey with Long or Short Sleeves, 335.
Knitted Jumper with Scarf to Match, 103.
Knitted Winter Sports Outfit, 527.

L Lamb, Fat, Farms, Pasture Management on, 125.
Lamb Fattening off White Clover in Poverty Bay, 295.
Lamb Growth on Pasture Topdressed with a Complex Trace Element Mixture, 239.
Lambing Estimates for 1954 Season, 21.
Lambs, Preventing, from Drowning in Drinking Troughs, 488.
Land, Aerial Topdressed Tussock, in South Canterbury, Survey of, 305.
Land Development, 589.
Land Development in Lower Clutha Basin, 311.
Land Improvement:
Breaking in Wairarapa Hill Country, 415.
Development in Lower Clutha Basin, 311.
Increasing Production on Bay of Islands Farm, 615.
Land, Light, Subterranean Clover Pastures, 31.
Laying Trial, Sixth, of Prospective Poultry Breeding Stock, 471.
Leonard, W. F.—
Control of Spanish Heath, 48.
Onion Seed Production, 289.
Leonard, W. F., Fitzgerald, J. N., and Gordon, R. B.—Chemical Weed Control, 187.
Lime in Canterbury, 25.
Livestock, Applications for Permits to Import, 592.
Livestock, Care of, during February, 24; during March, 124; during April, 264; during May, 374; during June, 492; during July, 588.
Lockie, M. Joanna, and Marcussen, K. H.—Flower Garden Notes, 215, 313, 517.
Lockie, M. Joanna, and Say, J. S.—Flower Garden Notes, 430.
Lockie, M. Joanna—Flower Garden Notes, 95.
Longwill, A.—
Better Pig Husbandry for Increased Production, 377.
Efficient Fattening House for Pigs, 459.
Lower Clutha Basin, Land Development in, 311.
Lucerne, Control of Grass in, 301.
Lucerne for Grazing in Maniatoto County, 605.
Lunn, W. A.—Lucerne for Grazing in Maniatoto County, 605.

M McIntosh, I. G., and Adams, T. W.—Control of Rats and Mice, 229.
McKellar, W. A.—Hormone Control of Nodding Thistle, 515.
Mackley, H. O.—Restraint of Ewe in Paddock, 578.
Maclean, Shona M., and Thornton, F. Helen—Tolerance of Pasture Grasses to T.C.A., 593.
Maclean, Shona M., Matthews, L. J., and Fitzgerald, J. N.—Tolerance of Clovers to Weedkillers, 450.
McNaught, K. J.—
Acidifying Effect of Sulphate of Ammonia, 416.
Trace Element Deficiencies in Market Garden Crops, 563.
Macpherson, Nell—
Guavas, 104.
Peppers, 102.
Use of Herbs in Cookery, 214.
Madden, E. A.—Farming and Rural Life on Chatham Islands, 338.
Maha Illuppallama Agricultural Research Station in Ceylon, 546.
Malting Barley, Header Damage in, 13.
Maniatoto County, Lucerne for Grazing in, 605.
Marcussen, K. H., and Lockie, M. Joanna—Flower Garden Notes, 215, 313, 517.
Marcussen, K. H., and Say, J. S.—Flower Garden Notes, 647.
Market Garden Crops, Trace Element Deficiencies in, 563.
Martin, C. A.—Dipping of In-lamb Ewes, 464.
Matamata Dairy Farm, Management of, 363.
Mats, Table, Cloths, and Napkins, Making, 535.
Matthews, L. J.—Chemical Weed Control, 400.
Matthews, L. J., Maclean, Shona M., and Fitzgerald, J. N.—Tolerance of Clovers to Weedkillers, 450.
Maturation of Grapes, Research Work on, 159.
Mayo, K. L., and Richards, J. G.—Land Development in Lower Clutha Basin, 311.
Mayo, K. L.—Installation of Effective Mole Drainage, 395.
Meat Pies, Raised, 91.
Meat Production per Acre, Increasing, 61.
Meteorological Records for November, 10; for December, 156; for January, 252; for February, 424; for March, 480; for April, 616.
Mice and Rats, Control of, 229.
Mice and Rats, Poisons for, 550.
Milk Recipes, 203.
Milk, Separated, in Pig Feeding, Antibiotic Supplements with, 85.
Milk, Sterilised, 551.
Miller, J. A.—Poisoning Wild Pigs with Arsenic Trioxide, 511.
Miller, Jean G.—History of Field Crop Experiments in New Zealand, 256.
Minister of Agriculture, Statement by, 226.
Mob Stocking on Hill Country, 242.
Mole Drainage, 395.
Molybdate Topdressing and Animal Health, 196.
Molybdenised Superphosphate, Reduction in Molybdenum Content of, 156.
Molybdenum Content of Molybdenised Superphosphate, Reduction in, 156.
Molybdenum, Responses to, 277.
Montgomery, R. G.—Carpet Beetle Damage, 629.
Moore, Evelyn E., and Johnson, L. H.—Easy-to-operate Kitchen Bins, 327.
Moore, Evelyn E.—
Handy Packets of Dates, 112.
Pockets in Housework Apron, 336.
Recipes with Rice, 443.
Testing Shrinkage in Fabrics, 94.
Versatile Scone Recipe, 631.
Mount Fuji Flowering Cherry, 270.

N Nairn, R. G.—Folding Wheelbarrow for Moving Beehives, 307.
Napkins, Table, Mats, and Cloths, Making, 535.
Native Trees and Shrubs for Flower Garden, 430.
Neale, G. J.—
Animal Production Society's Conference, 367.
Grassland Conference in Nelson, 39.
Nelson District, Commercial Raspberry Production in, 417.
Nelson, Grassland Conference in, 39.
Nodding Thistle, Hormone Control of, 515.
North Island Fat Lamb Farms, Winter Pasture Management on, 493.
Northland Gumland Development, 589.
Nylon Stockings, Choice and Care of, 209.
Nylon Stockings, New Life for, 646.

O Oats and Wheat, 265.
Olivecrona, C. M. B.—
Breaking in Wairarapa Hill Country, 415.
Danger of Faulty Use of Farm Circular Saw, 282.
Reinforcing of Concrete Posts, 240.
Onion Growing Trials on Rukuhia Peat, 489.
Onion Seed Production, 289.
Opossums, Crops Damaged by, 238.
Orange Baskets, Recipe for, 638.
Orchard, Home, in Winter, 465.
Orchards and Gardens, Auckland Home, Shelter for, 579.
Otago, Central, Cherry Growing in, 49.
Otago, Central, History of Fruit Growing in, 169.
Oversowing and Topdressing on Wanganui Hill Country, 287.
Oversowing Dairy Pastures, 265.
Owtram, I. H.—
Drinking Water for Pigs, 253.
Good Pig Management, 557.
N.Z. Pig Production and the Export Market, 35.

P Palmer-Jones, T., and Paterson, C. R.—Vacuum Plant for Removing Excess Water from Honey, 571.
Pampas Grass on Coastal Sand in Wellington Province, 599.
Parasites, External, of Household Poultry, Control of, 361.
Pasture Grasses, Tolerance of, to T.C.A., 593.
Pasture Management, 265.
Pasture Management in Autumn, 125.
Pasture Responses to Minor Elements, 513.
Pastures, Autumn-sown, 25.
Pastures, Dairy, Weed Control in, 562.
Pasture Topdressed with a Complex Trace Element Mixture, Lamb Growth on, 239.
Pastures, Drilling, with an Adapted Coulter, 310.
Pastures, Light Land Subterranean Clover, 31.
Pastures, Winter Management of, 375.
Paterson, C. R., and Palmer-Jones, T.—Vacuum Plant for Removing Excess Water from Honey, 571.

Paterson, C. R.—Beekeeper's Cool Room, 355.
Peat, Rukuhia, Onion Growing Trials on, 489.
Pedigree Sow Records, 144.
Peppers, 102.
Perennials for the Flower Garden, 313.
Permits to Import Livestock, Applications for, 592.
Phosphate Topdressing, 513.
Pies, Raised Meat, 91.
Pig Fattening House, Harper Adams, 141.
Pig Feeding, Antibiotic Supplements with Separated Milk in, 85.
Pig Husbandry, Improvement of, 377.
Pig Management, Good, 557.
Pig Production, New Zealand, and the Export Market, 35.
Pigs, Drinking Water for, 253.
Pigs, Efficient Fattening House for, 459.
Pigs, Large Roundworm of, 255.
Pigs, Wild, Poisoning, with Arsenic Trioxide, 511.
Plant Quarantine in New Zealand since 1884, 115.
Plough, Hydraulically Controlled, Swamp-land Improvement with, 273.
Pockets in Housework Apron, 336
Poisons for Rats and Mice, 550.
Posts, Concrete, for Farm Fences, 362.
Posts, Concrete, Reinforcing of, 240.
Potassic Fertilisers, 81.
Potato Crop, Farm Storage of, 407.
Potatoes in Diet, 329.
Poultry Breeding Stock, Prospective, Sixth Laying Trial of, 471.
Poultry Diseases, Prevention of, 27.
Poultry Flock Improvement Plan, 271.
Poultry, Household, Catching, 569.
Poultry Houses, Elevator for Cleaning, 591.
Poultry Husbandry in Britain, 151.
Poverty Bay, Lamb Fattening on White Clover in, 295.
Press, Steam, for Salvaging Beeswax, 83.
Prew, H. A.—Shelter for Auckland Home Gardens and Orchards, 579.
Propagation of Seedless Barberry, 477.
Pullets, Near-to-lay, Choice of, for Household Flocks, 129.
Pullover, Dolman-sleeved Knitted, 448.

Q Quarantine, Plant, in New Zealand since 1884, 115.

R Raised Meat Pies, 91.
Rankin, A. R.—Potassic Fertilisers in Southland, 81.
Raspberry Production, Commercial, in Nelson District, 417.
Rats and Mice, Control of, 229.
Rats and Mice, Poisons for, 550.
Recipes Requiring Milk, 203.
Recipes with Rice, 443.
Reid, T. L.—Chemical Weed Control, 400.
Reinforcing of Concrete Posts, 240.
Research Work by Extension Division:
Chemical Weed Control, 400.
Fertilisers, 81.
Molybdenum, 277.
Phosphate Topdressing, 513.
Tolerance of Pasture Grasses to T.C.A., 593.
Weed Control, 187.
Rice Recipes, 443.
Richards, J. G., and Mayo, K. L.—Land Development in Lower Clutha Basin, 311.
Richards, J. G.—Molybdenum Responses, 277.
Ring Spot on Granny Smith Apples, 283.
Roberts, D.—Domestic Beekeeping Notes, 89, 147, 267, 411.
Rose Culture, 215.
Rotary Hoe, Modified, on South Canterbury Farm, 371.
Rotation, Winter, of Dry Stock on the Dairy Farm, 227.
Rotorua District, Control of Water Hyacinth in, 188.
Roundworm, Large, of Pigs, 255.
Ruakura Farmers' Conference Week, 470.
Rukuhia Peat, Onion Growing Trials on, 489.
Ryecorn as a Greenfeed Crop, 146.

S Salt, Common, as Fertiliser, 81.
Sand, Coastal, in Wellington Province, Pampas Grass on, 599.
Sand Country, Potash on, 81.
Saw, Farm Circular, Danger of Faulty Use of, 282.
Say, J. S., and Lockie, M. Joanna—Flower Garden Notes, 430.
Say, J. S., and Marcussen, K. H.—Flower Garden Notes, 647.
Schofield, R. C.—Cleaning Irrigation Races, 394.
Scone Recipe, Versatile, 631.
Scoop, Small, for Fruit and Vegetables, 328.
Scott, D. F.—Drain Cleaning Attachment for a Tractor, 491.
Scott, J. D. J.—Soil Testing, 125.
Seasonal Notes by Extension Division, 25, 125, 265, 375, 493, 589.
Seed, Chewings Fescue, 589.
Seedless Barberry, Propagation of, 477.
Seed Production, Onion, 289.
Seeds, Danger in Storing, near Weedkillers, 502.
Separated Milk in Pig Feeding, Antibiotic Supplements with, 85.
Sheep Dip Stirrer, 80.
Sheep, Drenching to Control Worms in, 23.
Sheep, Winter Feeding of, Electric Fence in, 272.
Shelter for Auckland Home Gardens and Orchards, 579.
Shepherd, J.—Regrassing of Dredge Tailings in Westland County, 384.
Shrinkage in Fabrics, Testing, 94.
Shrubs and Trees for Coastal Gardens, 517.
Shrubs and Trees, Native, for Flower Garden, 430.
Shrubs for Summer Colour in Flower Garden, 95.
Sievwright, H. M.—Survey of Aerial Topdressed Tussock Land in South Canterbury, 305.
Silver Cleaning, Short Cut in, 100.
Simpson, J. E. V., and Sinclair, D. P.—Lamb Fattening off White Clover in Poverty Bay, 295.
Sinclair, D. P., and Simpson, J. E. V.—Lamb Fattening off White Clover in Poverty Bay, 295.
Smith, B. A. J.—
Potash on Sand Country, 81.
Weed Control in Dairy Pastures, 562.
Smith, D. M.—Antibiotic Supplements with Separated Milk in Pig Feeding, 85.
Smith, E. G.—Cultivation for Forage Crops, 375.
Soil Analyses, Problems in Interpreting, 279.
Soils, Problem, in Home Gardens, 65.
Soil Testing, 125.
Soil Testing Service to Farmers, 507.
South Canterbury Farm, Modified Rotary Hoe on, 371.
South Canterbury, Survey of Aerial Topdressed Tussock Land in, 305.
South Island Fat Lamb Farms, Winter Pasture Management on, 493.
South Island Land Development, 589.
Sow Records, Pedigree, 144.
Spanish Heath, Control of, 48.
Sports Outfit, Knitted Winter, 527.
Stagg, K.—Home Orchard in Autumn, 157.
Stainton, E. G.—Vanadium, 81.
Standards Institute, New Zealand, Specifications for Fences, 362.
Steam Press for Salvaging Beeswax, 83.
Sterilised Milk, 551.
Stirrer, Sheep Dip, 80.
Stockdill, S. M. J.—
Break Feeding of Turnip Crops, 493.
Molybdenum Responses, 277.
Stock, Dry, on the Dairy Farm, Winter Rotation of, 227.
Stocking, Mob, on Hill Country, 242.
Stockings, Nylon, Choice and Care of, 209.
Stockings, Nylon, New Life for, 646.
Stock, Prospective Poultry Breeding, Sixth Laying Trial of, 471.
Storage, Farm, of the Potato Crop, 407.
Strain, Maud B.—
Double Boilers, 208.
Fruit Desserts for Winter, 542.
Ironing Synthetic Fabrics, 328.
Potatoes in Diet, 329.
Quickly Made Fruit Desserts, 425.
Raised Meat Pies, 91.
Recipes Requiring Milk, 203.
Stuart, A.—Renovation of Chewings Fescue Stands, 589.
Subdivision on Dairy Farms with the Hunter Fence, 312.
Subterranean Clover Pastures, Light Land, 31.
Sugared Fruits, 212
Suit, Sun, Toddler's, 101.
Sulphate of Ammonia, Acidifying Effect of, 416.
Sun Suit, Toddler's, 101.
Superphosphate, Double, 81.
Superphosphate, Molybdenised, Reduction in Molybdenum Content of, 156.
Supplementary Feeding, 493.
Supplements, Antibiotic, with Separated Milk in Pig Feeding, 85.
Swamp-land Improvement with Hydraulically Controlled Plough, 273.
Synthetic Fabrics, Ironing, 328.

T Table Mats, Cloths, and Napkins, Making, 535.
Taranaki Farmers' Week in, 470.
Taylor, C. R.—
Control of Water Hyacinth in Rotorua District, 188.
Ryecorn as a Greenfeed Crop, 146.
T.C.A., Tolerance of Pasture Grasses to, 593.
Thistle, Nodding, Hormone Control of, 515.
Thornton, F. Helen, and Maclean, Shona M.—Tolerance of Pasture Grasses to T.C.A. 593.
Toddler's Sun Suit, 101.
Tomato Spacing Trials, Glasshouse, 608.
Topdressing, 125.
Topdressing and Oversowing on Wanganui Hill Country, 287.
Topdressing in Waimarino County, 497.
Topdressing, Molybdate, and Animal Health, 196.
Trace Element Deficiencies in Market Garden Crops, 563.
Trace Element Mixture, Complex, Lamb Growth on Pasture Topdressed with a, 239.
Tractor, Drain Cleaning Attachment for, 491.
Training Farm of Instruction, Wairarapa, 140.
Tree Planting, 503.
Trees and Shrubs for Coastal Gardens, 517.
Trees and Shrubs, Native, for Flower Garden, 430.
Trees on the Farm:
Choice of Species, 595.
Planning a Woodlot, 409.
Planting Technique, 503.
Trees as a Crop, 237.
Tropical Territories, New Zealand's, Agriculture in, 3.
Troughs, Drinking, Preventing Lambs from Drowning in, 488.
Trousseau, Choosing a, 321.
Turnip Crops, Break Feeding of, 493.
Tussock Land, Aerial Topdressed, in South Canterbury, Survey of, 305.
Twomey, T. P. J.—Sterilised Milk, 551.

V Vacuum Plant for Removing Excess Water from Honey, 571.
Valentine, G. M., Death of, 140.
Vanadium, 81.
Vegetable and Fruit Scoop, 328.

W Waimarino County, Topdressing in, 497.
Wairarapa Hill Country, Breaking in, 415.
Wairarapa Training Farm of Instruction, 140.
Walker, D. E. K.—Increasing Meat Production per Acre, 61.
Walker, S. D.—
Investigations of Dryland Farming Methods, 383.
Phosphate Topdressing for Grassland, 513.
Wanganui Hill Country, Oversowing and Topdressing on, 287.
Water, Drinking, for Pigs, 253.
Water Hyacinth in Rotorua District, Control of, 188.
Watson, H. H.—Household Poultry Notes, 11, 129, 241, 361, 495, 569.
Weed Control, Chemical, 187, 400.
Weed Control in Dairy Pastures, 562.
Weedkillers, Danger in Storing Seeds near, 502.
Weedkillers, Tolerance of Clovers to, 450.
Wellington Province, Pampas Grass on Coastal Sand in, 599.
Westland County, Regrassing of Dredge Tailings in, 384.
Wheat and Oats, 265.
Wheat Growing in Canterbury, 161.
Wheelbarrow, Folding, for Moving Beehives, 307.
White Clover in Poverty Bay, Lamb Fattening off, 295.
Whitten, L. K.—
Drenching to Control Worms in Sheep, 23.
Large Roundworm of Pigs, 255.
Wickenden, G. L.—Movable Grinder Stand for Woolshed, 509.
Wilkin, F. E.—
Chinese Wisteria, 458.
Clematis indivisa, 476.
Idesia polycarpa, 436.
Mount Fuji Flowering Cherry, 270.
Winter Feeding of Sheep, Electric Fence in, 272.
Winter Fruit Desserts, 542.
Winter Management of Pastures, 375, 493.
Winter Rotation of Dry Stock on the Dairy Farm, 227.
Winter Sports Outfit, Knitted, 527
Wisteria, Chinese, 458.
Woodhead, C. E.—Ring Spot on Granny Smith Apples, 283.
Woodlot, Planning a, 409.
Woolshed, Movable Grinder Stand for, 509.
Woolsheds, Dual-purpose Gate for, 202.
Worms in Sheep, Drenching to Control, 23.
Wraight, J. D.—Lime in Canterbury, 25.

Y Yates, R. E.—Propagation of Seedless Barberry, 477.
Yeast Cookery, 529.
Young Farmers' Clubs' 21st Anniversary, 226.

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington—1165

"Say fellers... this isn't baby-stuff.. ..there's MONEY in this game!"

A Westinghouse Recold Cool Store can make money for you as sure as apples are apples! We are certain about the savings you will make because we have built many, many cool stores for many satisfied clients. These practical orchardists tell us how they are cutting waste right out of their orchards . . . how fruit is reaching markets in prime condition . . . how cool stores save transport and storage worries completely.

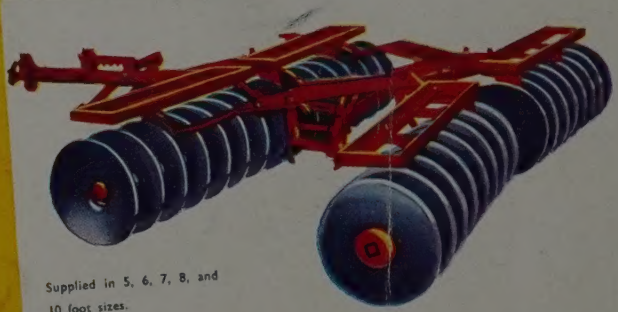
We would like to help you too! Write to us! Give us your address and, if you like, we will send a Westinghouse Engineer to quote you for a cool store—ready for next season! Inspection and quote is FREE . . . no obligation whatsoever. See address below.

WRITE FOR A FREE ORCHARD INSPECTION to H. W. CLARKE (N.Z.) LTD., 42-46 Cable Street, Wellington. 10 Teed Street, Newmarket, Auckland. 256 Cashel Street, Christchurch. 1 Cliff Street, Timaru. 84 Tainui Street, Greymouth. 28A Bridge Street, Nelson. 78 Fitzherbert Avenue, Palmerston North. Corner Great King-St. Andrew's Sts., Dunedin.

Z-9-A
TRACTOR
DISC HARROW

You will make finer seedbeds faster, with this robust Z-9-A harrow.

Cross draught connections keep discs on right course. Angling is easy, each gang floats independently. Crimped centres on disc give greater strength, firm gang assemblies; specially ground edges remain sharp, cut cleanly



Supplied in 5, 6, 7, 8, and 10 foot sizes.

McCORMICK
INTERNATIONAL

Z-13
BUSH & BOG
HARROW

Effectively breaks up rough, difficult ground, cuts tough vegetation.

Designed for working in heavy ground and strong growing weeds, bracken fern, rough vegetation, this McCormick International bush and bog disc harrow ensures really efficient work. Cut-out discs sever thick stalks cleanly, incorporating them into the soil. Wherever you have heavy going and a large amount of surface trash, this tractor disc harrow will supply your needs.

Supplied in 6½, 8, and 9½ foot sizes, both single and tandem.

INTERNATIONAL HARVESTER

INTERNATIONAL HARVESTER

INTERNATIONAL HARVESTER COMPANY OF N.Z. LTD.

Branches and Dealers throughout New Zealand